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NOTES ON SPORADIC PNEUMONIA IN CATTLE; ITS CAUSATION AND DIFFERENTIATION FROM CONTAGIOUS PLEURO-PNEUMONIA.

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THE above title heads an exhaustive and important article by Dr. Theobald Smith, in the recently issued number of the "Annual Reports of the Bureau of Animal Industry," issued by the United States Department of Agriculture for the years 1895 and 1896, and which is reproduced on page 4.

As the article contains a considerable amount of interesting detail, accompanied with several good plates, it would be somewhat difficult without the assistance of the detail and the plates, to give a fair description of its contents in the space at command: all interested (and what veterinarian is not), must read the article itself.

It has, however, seemed to me that in view of the still disputed points of similarity and difference (in our country) between simple broncho-pneumonia, here also called "sporadic" and the much dreaded contagious pleuro-pneumonia, it might not be out of place to emphasise by reference to that article, several questions which we thought had been previously satisfactorily settled among ourselves. With all our admiration of the high attainments, skill,and business-like way of description of results, qualities which more than elsewhere, perhaps, are to be found combined in the American scientist, it is the more to be lamented that now and again, in science as in politics, the typical American should be oblivious of what goes on in Europe.

Of course, in these days, it becomes very difficult to embrace in reference even the names of all the workers on a particular subject, far less their individual results; but in reference to a matter where difference of scientific opinion

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has run very high, where commercial interests have compelled many to attend to disputes that otherwise would have gone on, perhaps, unheeded, and where it is to be feared the disturbing element of professional jealousy has not been entirely absent, care ought to have been taken that justice was done in mentioning, at least, the names of those on our side of the pond who had long ago arrived at much the same conclusions. The present reference to the article in question is, perhaps on my part at least, largely due to the fact that during the whole course of the much-discussed question of the presence of contagious pleuro-pneumonia in American cattle sent to this country, I have had the opportunity of handling and examining, personally, specimens of nearly all the disputed cases. This I could scarcely fail to do, as from my daily intercourse with Principal Williams, of the New Veterinary College, Edinburgh, much of that gentleman's work on this matter was conspicuously before me. Indeed, I am the more inclined to mention this because I find reference made in the above article to Nocard, the famous French expert on this subject, whose views, by-the-way, on the presence of broncho-pneumonia in American cattle, although counter to that of a large number of "our people," are endorsed by the author, just as they had been almost the identical views held by Professor Williams, against many who insisted that the cases at issue were cases of contagious "pleuro."

Nocard's conclusions, corroborating those of Professor Williams, have been brought into this dispute long ago, and some of our wiseacres have chosen to ignore them. Surely it cannot be beyond the cognisance of Dr. Smith that British, as well as French scientists, have arrived at results similar to his own, and apart altogether from the question of priority (in which, however, I feel certain the N.B. worker comes before the illustrious Frenchman), the name of Nocard ought not to have stood alone as corroborative of the views of the American pathologists against the views, at least the statements, of men in our island who had apparently undertaken, in some instances, the rather difficult task of making a miserable mixture of politics and pathology. Behind all this apparent show of fight, scientific men—at least, those worthy of the name—like lawyers, never quarrel, and all parties interested in the "pleuro" problem and the meat supply will hail with satisfaction the clearly-written report of Theobald Smith. In reading the article it will be noticed, however, that, like all true scientists, there is the absence from his sentences of that cock-sure tone of description so common

among our own back benches—he, in fact, says "it would seem that the gross and microscopic character of the disease, all taken together, furnish enough evidence upon which to base a *fairly* reliable decision." (Italics our own.)

Space entirely prevents anything like even a just epitome of the paper, but it may, perhaps, serve the purpose to quote a few passages which, but for a difference in style and nomenclature, might be taken for reprints of what has already appeared in these pages from the pen of Professor Williams and others.

"The hepatisation of the parenchyma in broncho-pneumonia is readily distinguished in microscopic sections, even with a hand lens, from that of pleuro-pneumonia by its focal arrangement. Each minute bronchus is plugged with cell masses and around it is a zone of alveoli similarly occupied. In the hepatisation of pleuro-pneumonia this focal arrangement is absent, and the alveoli are uniformly filled with fibrin or a variable mixture of fibrin and cells, depending on the stage of the disease." He speaks also very clearly of the plugging of the veins and lymphatics in "pleuro," with thrombi and hæmorrhagic infarctions, and the pretty general escape of the arteries. There will be found also a clear comparison between the lines of inflamed connective tissue surrounding the large vessels and separating the lobules in pleuro-pneumonia, and the "comparative absence of cell infiltration around the large bronchi and bloodvessels in broncho-pneumonia."

A very good comparison is made between the bacteriology of broncho-pneumonia with that seen in cattle suffering from the disease called by Dr. V. A. Moore, "Cornstalk Disease." The bacterium, staining at the ends with a central part remaining clearish, seems to be the same in both, and indeed, if I remember rightly, these identical organisms were shown by Mr. Thomas Bowhill at a meeting of the Scottish Metropolitan Veterinary Society, prepared in the laboratory of the New Veterinary College from specimens, parts of which were subsequently sent to Nocard, and found by him to give similar results.

"Cultivation of 'pleuro'" in Smith's words "is extremely poor in bacteria, and that if one collects it with precaution against contamination from the infiltrated connective tissue septa, it ordinarily is sterile," whereas in broncho-pneumonia, the converse is the case. Smith accepts Nocard's views that although closely resembling contagious pleuro-pneumonia, the so-called "cornstalk disease" of America is simply an aggravated form of broncho-pneumonia, associated with the same

bacteria found in broncho-pneumonia resulting from other causes.

From the comparative study I made at the time, when the pleuro-anti-broncho discussion was at its hottest, from the photographic and other methods by which I took part in bringing the opposing views before several Societies of veterinarians and microscopists, I have derived much pleasure indeed in receiving so plainly (although I have suggested rather unhandsomely) a corroboration of the views I felt compelled to adopt after seeing the specimens upon which Principal Williams had formed his opinion.

In Government reports one does not quite look for the courteous references of a special treatise, but in view of the stubborn survival of the opposing opinions (and it is wonderful how stubborn officialism can make even scientific men), I have deemed it but justice to claim again for our Scottish veteran veterinarian the first intelligent account of that disease in American cattle, so persistently set down by some as pleuro-pneumonia :—

Though contagious pleuro-pneumonia, the great scourge of the bovine species, has been successfully rooted out from the United States, it has been of not infrequent occurrence since to have animals shipped from this country condemned in England as affected with this disease. Differences of opinion concerning the character of certain cases of lung disease in cattle have been frequently offered, not only in England but also in this country, and it must be truly said that no unanimity exists as to what is and what is not contagious pleuro-pneumonia. In view of this state of affairs it was deemed desirable to publish some observations made during the past eight years in the hope that perhaps a little light may be shed on the subject, or, at least, a stimulus given for a more exhaustive study of the different forms of lung disease in cattle and their causation, and for the development of a more rational view concerning the etiology of the lung disease in cattle leaving our ports. In the absence of any positive knowledge concerning the cause of contagious pleuro-pneumonia certain forms of lung disease will continue to remain obscure, and a source of doubt wherever the contagion is known to exist; but there are other forms which, it appears to the writer, do not come under this category, but may at once be regarded as non-specific forms of disease.

The following studies were made entirely upon lungs received from different parts of the country. Some were obtained from cattle shipped to England, and there condemned as affected with contagious pleuro-pneumonia. In many cases only portions of lungs were received. In others the entire lungs were accessible, and from a few of such complete specimens much suggestive information was obtained. The investigation consisted in a careful inspection and dissection of the lungs, in the microscopic examination of teased preparations and secretions of fresh lung tissue, of sections of tissue hardened in various ways, of bacteriological examinations, and of inoculations of isolated bacteria and portions of tissue into animals to determine pathogenic activity.

The kinds of lung disease which have been encountered may, for convenience, be grouped under the following heads :—

1. Simple broncho-pneumonia.
2. Broncho-pneumonia with interlobular emphysema.

3. Broncho-pneumonia with interlobular exudate.
4. Traumatic pneumonia.
5. Contagious pleuro-pneumonia.*

To these might be added cases of actinomycosis of the lungs, which do not come within the scope of the present discussion.†

Some Characters of Sporadic Pneumonia.

Simple broncho-pneumonia, or, indeed, any diseased condition of the lungs, is not so common an occurrence in cattle as might be supposed. Of 200 animals killed and examined for tuberculosis after the tuberculin test I found but one animal with a single lobe affected.‡

In introducing this rare, though well-known, lung affection here my object is to trace the evolution of the peculiar, often striking, interlobular changes associated with broncho-pneumonia, which give rise to a regular marbling of the cut surface of the lung tissue, and which are, without doubt, frequently referred to contagious pleuro-pneumonia as the cause. In using the word marbling I restrict it for the moment to the presence of a network of whitish interlobular bands. The variegated color of the cut surface of lungs affected with acute pleuro-pneumonia to which the term marbling is sometimes applied does not appear in any other type of lung affection.

Simple broncho-pneumonia may be limited at the outset to the small ventral lobes on one or both sides. As the disease progresses it tends to extend to the cephalic lobes, and, lastly, to the large caudal lobes. This extension forward as well as backward (in the standing position of the animal) is almost invariably symmetrical on both sides. The invaded portions of the lungs are, moreover, the lowest or most dependent portion of the lungs. This can easily be seen by holding the lungs in the position they occupy in the standing animal. The extension of the disease forward and backward is always accompanied by an extension upward toward the back of the animal, where a strip of air-containing lung tissue may be found after death as the only portion still performing its function to the last.§

In the early stages of this lung disease the appearance of the diseased lobe is usually as follows: —The affected portions are slightly, if any, larger than the healthy lobes in the collapsed state after the thorax has been opened. The color is dark red or grayish red, often mottled quite regularly with minute hazy, grayish dots. The lung tissue feels firm to the touch, often nodular, because of the presence of minute hard bodies embedded in it. These are groups of air vesicles greatly distended with catarrhal (cellular) masses. The diseased, red portion of the lobe is irregularly marked off from the air-containing portion, and not infrequently pervious lobules are found embedded in the hepatized lobes. These lobules are then very much distended and emphysematous. When the air tubes of such a lobe are slit open they are, as a rule, found covered with whitish mucus mixed with pus. The mucous membrane is of a dusky hue, often dotted with fresh hæmorrhages. These remarks apply to the small ventral lobes in which the disease usually begins, and in which progress appears to be quite slow. When the large caudal lobes become affected the course of the disease is more rapid, for the lesions

* It is, perhaps, needless to add here that cases of pleuro-pneumonia have not come under observation since the close of the work of suppression.

† Special Report on Diseases of Cattle, p. 411, pl. xl.

‡ This estimate excludes pneumonia due to tuberculosis and injury.

§ In infectious pneumonia of swine (swine plague) the lungs are similarly affected. In fact, I have encountered only a few cases of lung disease in swine not due to injury, in which the dependent portions of the lungs were not diseased first, and the dorsal or upper portion previous to the last. (See Report on Swine Plague, 1891, p. 98, pls. i.-vi.)

have a fresher, more uniform appearance throughout the attacked portion. In this advance to other lobes a new feature appears which is of considerable interest. Owing to the filling up of such large territories of lung tissue breathing becomes more difficult, and under any strain the laboured respiration causes rupture of the air vesicles and the filling up of the interlobular connective tissue with air (emphysema). The distension of the connective tissue can also be traced in some cases along the perivascular sheath of the large intrapulmonary veins. The appearance of air bubbles under the pleura is also a common occurrence.

A further stage in the evolution of interlobular lesions is the filling up of the distended lymph spaces, wholly or partially with a whitish coagulated lymph. The lymph spaces may be completely filled with whitish plugs, easily lifted out of the containing mould. Such plugs are very firm, and are torn to pieces with great difficulty. They consist almost wholly of fibrin. In other cases the cavities formed by the air are too large to be filled up entirely by the coagulated lymph. A thick coating may then form on the walls of the cavity and leave a central hole resembling the cavities in certain kinds of cheese. The interlobular bands are more or less honeycombed with cavities of various dimensions. We may thus have some cavities unfilled, some completely and some only partly filled with the firm coagula. The impossibility of a reduction of the distended spaces which have to be formed in the connective tissue is due to this solidification of the lymph, which gives the appearance of a congealed condition. The lung tissue in these affected lobes becomes rigid. Normal collapse is no longer possible, even though the lung tissue itself remain unaffected.

It is evident from what has been stated that these interlobular plugs and bands may arise in the absence of any pre-existing pneumonia when the emphysema has been extensive and the flow of lymph is retarded. The cause of the coagulation is probably the presence of air, together with bacteria, and possibly catarrhal secretions from ruptured air vesicles. When broncho-pneumonia is present these elements combined seem to be more than sufficient to account for the coagulation and other changes following the coagulation to be referred to below; when broncho-pneumonia is not present a temporary delay of the lymph flow may account for the coagulation of the stagnating lymph.

The distension of the interlobular tissue with air and the subsequent filling up or thrombosis of the spaces is nearly always limited to the still air-containing or freshly hepatized lung tissue. Rarely are plugs found among the lobules of the small ventral lobes in which the hepatization is of long standing. This is to be accounted for by the fact that the emphysema naturally occurs where respiration is most active, *i.e.*, in those lobes where the parenchyma is not yet filled up, and where the greatest expansion takes place during respiration. The marbling is thus most frequently found in the large caudal lobes where hepatization is still absent or newly formed. A few illustrations of the conditions here described are given below. In the following the interlobular changes are mainly emphysematous, with but little plugging or exudation:

Lung A, January 2, 1891.—Both lungs of a cow received from New Jersey this morning. In both the hepatization was quite extensive and restricted to the anterior (cephalic) half. In the right lung the larger division of the cephalic lobe has the dependent half hepatized, while only a small region of the other division is solid. In this lung the ventral, median or azygos, and the adjacent fourth of the large caudal lobe are also hepatized.

In the left lung a small part of the cephalic, the entire ventral, and the adjacent fourth of caudal lobe hepatized. There was no pleuritis.

Throughout both lungs, but especially marked in the non-hepatized portions of the caudal lobes, the interlobular tissue is greatly distended with air, so that the individual

lobules are in part separated from one another by imprisoned air and readily dissected out. The lungs are thereby greatly enlarged in appearance. These spaces contain not infrequently firm whitish coagula (lymph thrombi). The hepatized tissue is of a bright red colour mottled with faint greyish or yellowish dots. It is quite firm and nodular to the touch, the nodules evidently corresponding to the greyish or yellowish dots, which in turn represent the subpleural, ultimate air spaces distended with exudate. This was composed chiefly of large granular cells, mixed with blood corpuscles. In preparations stained with alkaline methylene blue no bacteria were detected. The description given applies to all of the hepatization, excepting about one-quarter of the median or azygos lobe, which is smooth, firmer, and yellowish in colour, and in which the exudate consists entirely of pus cells (polynuclear leucocytes). This evidently represents a more advanced stage of the disease.

Trachea and bronchi have the mucosa coated with a thin layer of fine white foam.

Portions of both the red and the yellow hepatized regions were hardened in alcohol and sections prepared. In those from the red hepatization perhaps the most obvious fact observed was the occlusion of the minute bronchioles with cell-massed and the peribronchial cell infiltration, causing a considerable thickening of the walls of the smaller air tubes. The alveoli around these bronchioles, as well as other groups of alveoli not traceable to air tubes in the sections examined, were fully distended with cells, while outside of these a zone of alveoli were free from exudate, but more or less collapsed.

In sections from tissue having a more uniformly yellowish colour the lesions were somewhat different, in that there were small foci in which the alveoli were very densely packed with cells, while outside of these, and sharply separated from them, were areas in which the alveoli contained fibrin and very few cells.

The interlobular tissue is broadened and composed of a very delicate network of fibrin inclosing isolated cells in its meshes. These cells are not massed at any place, but indifferently scattered throughout.

The following case is one of broncho-pneumonia, showing the usual symmetrical distribution of lesions, upon which are superimposed exudative and suppurative changes in the interlobular tissue:

Lung No. 30, *March* 12, 1892.—Lungs received to-day in good condition, free from any odour of decomposition.

The pneumonia is more or less generalized; pleuritis slight. In the right lung the dependent free portion of the cephalic lobe, the entire ventral lobe, and about one-third of the caudal lobe (latero-cephalic region) involved.

In the left lung the distribution of the disease is the same, but the amount of disease in each lobe is less than in the right lung. In the caudal lobe there are, in addition, several isolated pneumonic foci. The median or azygos lobe is likewise involved. There is more or less subpleural emphysema over hepatized regions. The lesions in this lung are both parenchymatous and interlobular. The parenchymatous changes are due in part to a broncho-pneumonia, in part secondarily to the rigid condition of the lung tissue following the formation of an interlobular exudate. To the naked eye the parenchyma is pale red and mottled with closely set greyish or pale yellow dots. In sections of hardened tissue these appearances are interpreted as minute broncho-pneumonic foci. The small bronchi are plugged with cell masses, the peribronchial tissue is infiltrated, and there is more or less filling up of the neighbouring alveoli with cell masses. The mucosa of the larger air tubes is coated with more or less brownish-red, viscid mucus. When this is removed the subjacent mucous membrane is reddened in points and arborescent lines.

The interlobular disease is disseminated over the greater portion of the lung tissue, but is most prominent in the large caudal lobes. It may or may not be associated with hepatization of the parenchyma. It appears as mere interlobular emphysema, with a slight thickening or opacity of the connective tissue, and as an exudate filling out the cavities formed by the emphysema. The exudate appears as greyish, somewhat translucent bands about one to two millimeters thick. In the course of these bands enlargements occur. The bands enclose removeable plugs, the outer zone of which is yellow, the inner pinkish-grey, and of a soft, gelatinous texture. When removed, the plug is found composed of a very firm, elastic mass, coated with a thin layer of leucocytes. The mass of leucocytes (or pus) contains many very minute bacteria. In sections of hardened tissue these suppurative lymph thrombi are easily studied. The greyish bands which enclose them are made up of immature connective tissue. The line suppuration is indicated as a very dense layer of leucocytes, in part disintegrated. Within this the fibrinous nature of the plug is still recognisable. The firm connective tissue character of the bands is further demonstrated by the fact that the parenchyma can be scraped away from it, leaving the whitish neoplastic partition behind.

Though most prominent in the caudal lobes, the interlobular exudate is present in the other lobes as well. In the left caudal lobe one of the interlobular spaces is nearly half-an-inch wide, and contains, in a length of two or three inches, three suppurative foci.

The following cases are of special interest. The lesions in the lungs of one very closely simulate the gross appearances of contagious pleuro-pneumonia so far as the interlobular disease is concerned. In the other, interlobular disease was absent. Both were primarily affected with broncho-pneumonia. Both animals had been subjected to the same conditions. On March 20th, 1893, they were taken from the Union Stock Yards at New York to a stable in Secaucus, N.J., three or four miles distant. Probably this journey gave rise to the emphysema and the subsequent interlobular changes.

Lung No. 46.—Lungs received at the laboratory March 31st, 1893, in a perfectly fresh condition. They were extensively diseased, the distribution of the diseased regions being that of the ordinary broncho-pneumonia. The dependent portions of the small ventral and cephalic lobes of both lungs and the portion of both caudal lobes adjacent to these were involved. The lesions vary in different parts of the lungs. The broncho-pneumonia is most advanced in the dependent ventral lobes, and interlobular disease is absent, if we except some subpleural emphysema. In the cephalic lobes the broncho-pneumonia is more recent, and there is associated with it the distension of the interlobular tissue with firm, removable, fibrinous plugs. In the large caudal lobes the process is still more recent. The broncho-pneumonia is just beginning to appear, while the interlobular disease is extensive and well advanced toward suppuration.

If we take the ventral lobes as a starting point of our description, as they are undoubtedly the focus whence the disease has spread into the other lobes, the subject may be presented in the clearest manner.

The ventral lobes of both sides are in a state of pale-red hepatization, only slightly enlarged beyond the normal collapsed stage. The pleura is not affected. There is some subpleural emphysema. From the surface the parenchyma has a mottled appearance and is somewhat granular to the touch. On section it appears red, mottled uniformly with greyish dots which coalesce in some places into larger greyish masses. Some of these appear to be undergoing necrosis. The interlobular tissue is very slightly œdematous and contains occasional air bubbles. The larger bronchi are in general free from any exudation or secretions.

In sections from one of these lobes, hardened in alcohol, the minute air tubes are seen plugged with cell masses consisting largely of leucocytes intermixed with desquamated epithelium. The submucous tissue of the air tube is hyperplastic and the alveoli in the immediate neighbourhood filled with leucocytes and desquamated epithelium or with fibrin.

The parenchyma outside of these broncho-pneumonic foci is in certain regions partly, in others wholly, collapsed. In the former the alveolar walls are distended, the alveoli containing either a finely granulated material or else a few large cells from the alveolar walls. In the collapsed regions the walls of the alveoli are much broadened. The epithelium is prominent, desquamating, and the capillaries distended.

The cephalic lobes appear to be involved in a more recent disease. The subpleural lymphatics are plugged with fibrin. The lung tissue is pale red and very œdematous. The interlobular tissue is distended with large firm masses of fibrin, of a yellowish white color and very firm. Some readily fall out of the incised interlobular cavities, which do not collapse, since their walls are thickened by fibrinous deposits. Others are more firmly lodged. The size of the cavities, and consequently the width of the interlobular bands, varies considerably, some being as much as one-half of an inch wide. In sections from one of these lobes the parenchyma shows fewer changes than those observed in the ventral lobes. The broncho-pneumonic foci are present, but the parenchyma is still nearly free from exudative changes. However, there is a tendency toward collapse, with considerable broadening of the alveolar walls. The alveoli contain a finely granular substance.

The interlobular exudate, in the sections examined, consists of a homogeneous network of fibrin, in which cellular elements are sparsely but more or less uniformly distributed.

The caudal lobes presented some further changes. In the first place, the diseased region, limited to the cephalic third of the lobes, was distinctly enlarged and uniformly firm to the touch, in these respects resembling contagious pleuro-pneumonia. The surface has a distinctly mottled appearance, owing to the marked distension of the subpleural lymphatics with fibrinous plugs. This injection increases in prominence in the more dependent portions of the lobe. Subpleural emphysema appears over the still healthy adjacent regions of the lobes.

On section, the interlobular tissue at once arouses attention. It appears as intersecting whitish bands of varying width, the largest being about one-fourth of an inch in diameter. The appearance varies from band to band. The smallest have a homogeneous grayish appearance. The larger ones are characterised by zones of different color and consistency. Thus the centre is represented by a homogeneous, semitranslucent mass, outside of which is a pale yellowish border about one-half of a millimeter in diameter. Adjacent to the parenchyma is a thin, grayish, partly translucent border.

The parenchyma is more or less uniformly red, œdematous, and faintly mottled with grayish dots. In the main bronchus is a rather firm, grayish mass, containing fibrin, blood, and many leucocytes.

In sections of hardened tissue from this region minute broncho-pneumonic foci are visible to the naked eye. Under a high power the alveoli are seen in many places packed with leucocytes. These pneumonic regions are, as a rule, associated with a bronchus plugged with cell masses. The remainder of the parenchyma contains alveoli, either empty or filled with fibrin. The interlobular exudate is composed of several zones. The most prominent one, readily visible to the naked eye as a deeply stained band, is a dense zone of leucocytes. This surrounds a central mass of fibrin containing some scattering cells, and is in turn bounded externally by another zone of fibrin. Inclosing this whole mass is a narrow zone of embryonal connective tissue attached to the walls of the contiguous alveoli. In the smaller lymph plugs the mass of leucocytes may be situated centrally.

Lungs No. 47, received with No. 46.—They appear very large. The distribution of the pneumonia is the usual one of broncho-pneumonia. In the right lung the free half of the cephalic and of the ventral lobe and the latero-cephalic fourth of the caudal lobe is hepatized. In the left lung the affection is equally extensive. In the caudal lobes beyond the pneumonic region there are scattered hepatized lobules surrounded by air-containing tissue. One-half of the median lobe is hepatized. Over the lateral aspect of the left lung there is a marked fibrinous deposit fully one-eighth of an inch thick, gluing the various lobes together. The pneumonia is of the usual mottled type, *i.e.*, a red flesh ground in which pale yellowish dots are crowded. Contents of main bronchi as in No. 46.

The large size of the lungs is due to a very extensive interlobular emphysema of the large caudal lobes and to a certain extent of the air-containing portions of the other lobes. Exudation into the cavities thus formed and subsequent suppuration thereof, as in No. 46, has not yet taken place in these lungs.

Sections of tissue from three different regions of this lung hardened in alcohol were carefully examined.

(1) In the left caudal lobe, near the diaphragmatic surface, the small air tubes up to 0·4 mm. in diameter are plugged with dense cell masses, consisting of a mixture of leucocytes and epithelial elements, the former greatly predominating. The epithelium is still present. Among and below the epithelial cells are many polymorphous leucocytes. The peribronchial tissue is in a state of active hyperplasia. The parenchyma, viewed with the naked eye, has a mottled appearance, due to the broncho-pneumonic foci just described. Around the plugged bronchi there is a zone of alveoli distended with leucocyte elements, and intermingled with these a number distended with fibrin only. Outside of these foci the alveoli are largely collapsed and the walls broadened, owing to capillary distension. Only occasionally a partly collapsed air cell contains a group of leucocytes.

(2) In an isolated hepatized focus in the right caudal lobe, the broncho-pneumonic foci, which consist of cellular plugs in the air tube with the surrounding zone of alveoli filled with cell masses or with fibrin, are the same as in the sections from the left caudal lobe. The alveoli beyond these are not as a rule collapsed and the walls nearly normal. They are either empty or partly filled with finely granular material or contain a few desquamated epithelial cells.

(3) In sections from more advanced disease in the median lobe we observe the same broncho-pneumonic foci. They are not so demarcated, however, from the rest of the parenchyma, because the latter are quite generally collapsed and the aveolar walls much broadened. The peribronchial infiltration is likewise more extensive than in the more recent disease of the caudal lobes.

The foregoing cases show sufficiently well the different stages of lung affections from simple broncho-pneumonia to broncho-pneumonia associated with emphysema and finally interlobular thrombosis, inflammation, and suppuration. How far the cases with interlobular disease could be mistaken for contagious pleuro-pneumonia would depend upon the training, skill, and bias of the person upon whom the diagnosis depends.

The interlobular conditions described may appear in any form of infectious

lung disease, as, for instance, in contagious pleuro-pneumonia, in addition to the very characteristic interlobular and perivascular lesions of this disease. If my theory of their causation is correct, any disturbance which throws all the work of respiration upon a portion of the entire lung tissue might give rise to these interlobular changes. It is therefore likely to happen that these interlobular affections are regarded as the result of contagious pleuro-pneumonia, because they may be present in this disease. It should be borne in mind that they are non-specific lesions, the result of mechanical causes a secondary bacterial infections mainly.

Some causes of Sporadic Pneumonia.

The primary causes of the sporadic pneumonia (leaving aside all those which are manifestly infectious, and which usually attack many animals at the same time) are of several different kinds. Among these, exposure to cold, by which congestion of the mucous membrane of the air tubes may be produced, figures conspicuously in treatises on animal diseases. I have, in view of such possible causation, examined carefully the air tubes, as far as was possible with the naked eye, of all animals slaughtered after the tuberculin test, especially those killed in winter. It was a surprise to me to find very little inflammation of the bronchial tubes. Occasionally a little mucus was found in the terminal portion of the bronchi of the large caudal lobes, where broncho-pneumonia does not begin, and to which it rarely extends when begun. Only when tuberculosis changes had partly or wholly occluded a bronchial tube, catarrhal secretions were usually present in that tube only. Extensive tuberculosis of the lungs is not frequently associated with broncho-pneumonia, but in cases of this kind the latter is more obviously secondary to the former. We must look, therefore, for other causes than those of exposure, and among these the escape of foreign substances into the air tubes is probably the most frequent. In the administration of medicines, fluid or otherwise, there is much danger of an escape into the air tubes. The fluid will naturally gravitate to the most dependent portions and set up disease there first. These dependent portions are, first of all, the small ventral lobes, next, portions of the cephalic and caudal lobes. The amount and nature of the disease produced will depend on the quantity and character of the fluid which escapes into the lungs. If it is acrid or corrosive, a severe bronchitis with broncho-pneumonic changes will take place. If containing suspended matters, the fluid will probably produce occlusion of the smaller air tubes followed by broncho-pneumonia. The writer some years ago saw portions of a cow's lung in which the minute air tubes were completely occluded with a greenish powdery substance. The affected lobes were collapsed and of red flesh color. The persistence of the disease started by accidents appears to be due to the pathogenic bacteria of the throat washed down with fluids or other substances into the air tubes, as will be pointed out further on. The subsequent extension of the disease is most likely due to the aspiration of catarrhal secretions mingled with these pathogenic bacteria from the diseased into healthy air tubes. The distribution of the disease shows this mode of extension to be highly probable, for it is always governed by gravity, and the dorsal or uppermost portions of all lobes remain pervious to the last.

Other mechanical causes of lung disease in cattle by no means uncommon may here be mentioned for the sake of greater completeness.

It is a well known fact that a local thickening or increase of the interlobular tissue into a network of white bands may occur during all inflammatory affections due to foreign bodies which penetrate into the thorax from the second stomach and pierce one of the lobes of the lungs. The resulting abscess is always surrounded by a zone of dense hepatized lung tissue

permeated by bands of firm, whitish tissue. Thrombi or cavities in the interlobular lymph spaces I have not seen in such cases.*

Another form of injury which is likely to give rise to the diagnosis of contagious pleuro-pneumonia are blows upon the chest. In the transportation of cattle in vessels, the occurrence of such injuries during stormy weather would appear to be hardly avoidable. A severe blow upon the thorax might give rise to inflammation of the pleura, with laceration of tissue and hæmorrhage, into the lung tissue, which would lead to interlobular exudation and lymph thrombosis. The accidental aspiration of any pneumonia bacteria would add to the lesion by causing suppuration of the interlobular tissue. The existence of an evidently croupous inflammation of the lungs and interlobular exudate, and the absence of an initial broncho-pneumonia, might mislead an inspector into the diagnosis of contagious pleuro-pneumonia, especially if the personal bias were in that direction. These lesions should be thoroughly studied where exported cattle are being slaughtered, and the resemblances and differences between them and contagious pleuro-pneumonia definitely determined and published for the use of the inspectors. Such studies would sooner or later be accepted by foreign authorities and redound to the protection of American interests.

The Bacteriology of Sporadic Pneumonia.

It has already been stated that the causation of isolated or sporadic cases of lung disease in cattle is probably in all cases some mechanical or chemical agent to which certain pathogenic bacteria are superadded, which modify and prolong the disease. Their relation to these agents is probably similar to that existing between the tubercle bacillus as the primary agent of tuberculosis in the human lung and the streptococci as secondary invaders. The latter are the cause of more rapid destruction of tissue and of general constitutional disturbances, such as fever. In this section the bacteriological studies of sporadic pneumonia will be given mainly to elucidate the lesions simulating contagious pleuro-pneumonia. The relation of the bacteria found in sporadic pneumonia to epizootics of infectious pneumonia will be briefly reviewed in the following section.

The bacteria present in diseased lungs are not infrequently present in the mouth and upper air passages of healthy cattle. Experiments demonstrating this fact have been published by Dr. V. A. Moore in the writer's report on Swine Plague (p. 152) as far back as 1891. This point should be borne in mind, as it accounts for the presence of these bacteria in the air passages, lung tissue, and interlobular spaces of diseased lungs. The source of the pathogenic bacteria in sporadic pneumonias is thus an unfailing one, and always accessible. To facilitate the reader's comprehension of the following pages I might anticipate a little by stating that the pathogenic bacteria associated with these pneumonias are closely related and probably identical with the bacteria of swine plague (infectious pneumonia in swine).

When, as explained above, any severe strain or accidents have occurred which cause labored efforts at breathing, the pathogenic bacteria living in the mouth and pharynx may be drawn into the air tubes and thence into the ultimate air cells. From these they may be aspirated into the lymph spaces of the interlobular tissue together with the air and fluid through ruptures in

*E. Semmer (Deutsche Zeitschr. f. Thiermedicin XIII (1887) S. 187) observed case of interstitial pneumonia in a steer resulting from castration. The animal died six days after the operation. At the autopsy Semmer found the scrotum inflamed and the inflammation extending along the subcutis of abdomen and thorax. The peritoneal, pleural, and pericardial sacs contained much yellow fluid. The lungs were dark red but not hepatized, and the connective tissue inflamed and distended with the yellowish exudate. Semmer regards the interstitial pneumonia as the direct result of the infection caused by the operation.

the lung tissue. In this way, emphysema, followed by the coagulation of lymph, which becomes mixed with pathogenic bacteria, takes place. The presence of the pathogenic organisms in the interlobular exudate is demonstrated in the following two cases, which at that time were regarded as affected with contagious pleuro-pneumonia, although there were equally good reasons for considering the region from which they had come as free from this disease.

Case 1, December 22, 1887.—About one-third of one lung accessible to examination. The lesions in this portion were limited to the pleura and interlobular tissue. The pleura was nearly one-eighth of an inch thick, opaque, whitish; the interlobular tissue was thickened from one-quarter to one-half of an inch in width on section, whitish, firm, forming long trabeculæ, the lateral branches of which were but slightly infiltrated. The most striking feature of these interlobular bands was the honeycombed condition. They inclosed cavities about the size of a pea or bean, communicating with one another. They were so numerous as to comprise perhaps two-thirds of the space occupied by the newly-formed interlobular bands. Most of the cavities were empty. The remainder contained a rather viscid, translucent mass, or were filled out by molds of solid, whitish material. The parenchyma of the portions examined was not affected.

December 23. From the lung tissue kept on ice since yesterday cultivations were made by thoroughly scorching the surface of the lung along the interlobular bands with a red-hot platinum spatula. Along this scorched area an incision was made with flamed scalpels and the contents of the honeycombed bands carefully removed with platinum loop and placed in six tubes, three containing peptonized bouillon, and three blood serum. Several roll cultures, made at the same time, melted during the night.

December 24. In all the tubes a faint growth had appeared made up of very minute cocci, not over 6 μ long, usually single, rarely in pairs. The peptone bouillon was faintly clouded, the growth on the blood serum very feeble. In the former a capsule could be seen surrounding the cocci when examined in a hanging drop. By focusing on the edge of the drop where the cocci were crowded together and where the layer of liquid was very thin, the capsule could be distinctly seen. The cocci themselves were separated by the width of the capsules. Stained, the capsules disappeared, and the cocci resembled very closely the swine plague and rabbit septicæmia organisms.

The pathogenic action of this germ was tested by inoculating a calf December 24 in the lungs through the chest-wall with 5 cubic centimeters of a peptone bouillon culture. The calf was dead the next morning. The only lesions observable were scattered hæmorrhages in the thorax and abdomen under the serosa of the ribs, pericardium, and diaphragm. The cocci were detected in cultures from heart's blood.

From the blood of the calf a rabbit was inoculated by pricking the skin with a lancet. It died in five days. At the point of inoculation a little purulent infiltration and a few hemorrhagic points in the subcutis. Spleen very large, blackish and soft. In cover-glass preparations from blood and spleen numerous polar-stained cocci were found. Cultures confirmatory.

Case 2.—A lung from another case was brought to the laboratory late December 24. Owing to other work it was kept in the refrigerator until December 27 before cultures could be made therefrom. The lesions were the same in character as those observed in the first case, i.e., there was a considerable broadening of the interlobular and the subpleural tissue, but in this case the thickening appeared in spots rather than in bands, and, moreover, in the depths of the lung tissue. The infiltrated regions were rather firm and honeycombed, thus resembling certain kinds of cheese, both in texture and appearance. The largest cavities were nearly three-quarters of an inch in diameter, filled with a yellowish serum or with a gelatinous grayish substance. The septa branching from those which were infiltrated were in general not more than one-sixteenth inch thick, firm, cartilaginous in appearance. The parenchyma in the immediate neighbourhood of the involved septa was hyperæmic. No hepatization in the portion of lung examined. A considerable number of culture tubes were inoculated in a manner similar to that described for the first case. The difficulty, however, was increased owing to the fact that it was necessary in some instances to cut through lung tissue before reaching the interstitial infiltration. Cultures were made from the contents of nine cavities, two or three tubes being used for each cavity. Blood serum, gelatine and peptonized bouillon were used as culture media. On the following day the same coccus found in the first case appeared in some of the cultures. Only one of the tubes remained pure, however, for after two or three days other germs appeared, among them streptococci and large and small bacilli. The coccus appeared in cultures from six out of the nine cavities, no other germ appearing in more than one or two of the cultures. The capsule of the coccus, taken together with its minute

size and want of motility, made the determination of its presence under the microscope a matter of but little difficulty.

Cultures from this case were equally fatal to rabbits, as the following inoculations show:—

January 4, 1888, 0·25 cc. of a peptone-bouillon culture was injected beneath the skin of the thigh of a rabbit of medium size. Dead January 9. At the point of inoculation a rather pasty infiltration of slight extent in the subcutis. In the abdomen the coils of intestines are lightly glued to each other and to chest wall by a fibrino-cellular exudate, which likewise covers the spleen and liver with tenacious grayish membrane. Spleen large, dark, friable. Kidney diffusely reddened; urine contains much albumen. Few bacteria in the various organs; very many in the peritoneal exudate.

At the same time another rabbit was inoculated with the same culture by injection one-eighth of a cubic centimeter in an ear vein. Dead in twenty-four hours. Head drawn back, rigor well marked. Slight fibrinous exudate on intestines in the forms of threads and fibrils, due probably to the large number of cysticerci free in the cavity and in the omentum. Numerous cocci in spleen and liver with distinct polar stain. Cultures from the spleen, liver, and blood of these rabbits contained only the cocci injected.

On December 29 a calf six months old was inoculated into the right shoulder by injecting subcutaneously 5 cc. of a peptone-bouillon culture. For several days following the inoculation there was a slight swelling at the place of inoculation, with stiffness of the shoulder. The temperature rose 2°F. on the second day, but gradually subsided. On January 10 the swelling was the size of a hen's egg. The animal showed no other signs of disease, and remained well for months after.

January 7, 1888, a black calf was inoculated by injecting 15 cc. of a bouillon-peptone culture into the trachea. On the second day the temperature had risen 2½° F. No other signs of disease appeared, though the calf was watched for several months after. (These inoculations were made by Dr. F. L. Kilborne.)

As these cultures were made several years before I had any knowledge of the existence of certain pathogenic bacteria in the upper air passage of healthy cattle, and as these two lungs from which this bacterium was obtained, were regarded as affected with contagious pleuro-pneumonia, I naturally enough fell into the temporary error of regarding these bacteria as the cause of this infectious disease, as had been done by Poels and Nolen. The examination of a few lungs affected with undoubted pleuro-pneumonia soon after, promptly dispelled this hypothesis.

In the following notes it will be observed that the specific bacteria found in the cases just quoted, may be absent from lungs affected with unquestioned pleuro-pneumonia, although their presence might be anticipated wherever marked dyspnœa occurred before death. They were not detected in Nos. 3, 4, and 5, but were found in case No. 6.

Case 3, *December* 31, 1887.—Cultures on various substrata were made from a completely solidified lung showing the lesions of typical acute pleuro-pneumonia. Two gelatin roll cultures made from a particle of the hepatized parenchyma remained sterile. Of three peptone-bouillon cultures from the interstitial tissue, two remained sterile, and one contained three organisms, a wavy bacillus, a streptococcus, and a butyric bacillus. Three blood-serum cultures from the interstitial tissue remained free from growth. After keeping the lung on ice until January 3, six peptone-bouillon tubes were inoculated each with a particle of partly-organized pleural exudate. All but one remained clear. This contained a diplo-coccus. From the parenchyma minute bits of tissue were placed in three bouillon-peptone tubes. All became turbid and contained large bacilli, some motile, others not.

Case 4, *January* 6, 1888.—Lung of cow affected with contagious pleuro-pneumonia. The caudal lobe of the left lung was used for cultures. Of this all but the dorsal portion hepatized, of a dark red colour and granular on section. The interlobular tissue is partly distended with serum, partly thickened and fibrous in appearance. The dorsal portion is very œdematous, the interlobular and sub-pleural lymph spaces distended with a pale, yellowish serum. Tube and gelatin roll cultures were made from the œdematous and hepatized parenchyma, as well as from the interlobular tissue. Of the 14 cultures, all but 1 remained sterile. This contained a diplo-coccus different from the coccus obtained from cases 1 and 2.

Case 5.—Portions of the lungs taken January 13, 1888, from a cow affected with contagious pleuro-pneumonia, and kept near or below the freezing-point until January 16.

Pleura about 2 to 3 mm. thick, containing small cavities, empty or filled up with a gelatinous exudate. The interlobular infiltration is 4 to 5 mm. wide. When the lobules are torn apart, which is done with more or less facility, it is found that the interlobular thickening or exudate is represented by a deposit on the contiguous faces of the lobules, firm, whitish. Between these layers is a middle layer of exudate, which may be pulled out in shreds and which is rather tough, yellowish white. In other words, the interlobular exudate is more or less lamellar in its arrangement. In some portions of the lungs the interlobular tissue is similarly thickened and almost cartilaginous in appearance, containing empty spaces as large as split peas. The parenchyma more or less œdematous throughout the greater part of the lungs. In some places that part of the lobule touching the interlobular exudate is hæmorrhagic, in others one-quarter or one-half of the lobule is hemorrhagic. Rarely a few contiguous lobules are completely hemorrhagic. In a few places the lobules are hepatized, of a pale red aspect on section. The interlobular tissue very slightly thickened and distended with serum. Judging from the portions brought to the laboratory, hepatization was of slight extent. Series of cultures were made from the interlobular exudate, from the pleura, and from the œdematous parenchyma. All but one remain free from any growth. This contained a large vibrio.

Case 6.—An acute case of contagious pleuro-pneumonia, which died during the night of February 1, 1888. The entire left lung consolidated. Three tubes of bouillon inoculated from bits of tissue taken from the pleura and subjacent tissue, all contained the same coccus on the following day. This has no capsule, but is evidently identical with the coccus from cases 1 and 2, as the following inoculation shows: A rabbit inoculated subcutaneously from one of these cultures, died within forty-eight hours. There was a slight amount of purulent infiltration at the place of inoculation. Plastic exudate covering spleen, liver, and coils of intestines of a very tenacious character, and containing immense numbers of cocci. In blood they were few in number. In cultures from this rabbit the capsule appeared, though not so distinctly as in former cases.

In connection with these facts, pointing to the occasional presence of these pathogenic bacteria in lungs affected with contagious pleuro-pneumonia, it is of interest to note that in 1884 Poels and Nolen, of Rotterdam, Holland, published a preliminary communication of investigations made by them of contagious pleuro-pneumonia, and in 1886 a more detailed report appeared.*

The authors describe a nonmotile coccus which they found in lungs of 60 head of cattle slaughtered because affected with the disease. The coccus was found in abundance in the exudate into the alveoli, in the serum of the lymph spaces before coagulation, and in the pleural effusion. It was not detected in the lungs of healthy cattle. The cocci averaged about 0.9 μ in diameter, and were provided with capsules. They grew quite well on gelatin and agar-agar, and also multiplied to some extent on potato. On gelatin the growth slightly resembled Friedländer's bacillus. On potato the growth had a moist, feebly yellowish appearance.

Rabbits, guinea-pigs, dogs, and cattle were inoculated into the lungs directly through the chest wall. A certain number of the rabbits and guinea-pigs were killed for examination and the remainder survived. In those killed, slight pneumonic infiltrations were observed. Of the two cattle inoculated, considerable lung disease, with presence of the injected cocci, was observed in one case.

Several dogs received injections of culture liquid into the trachea. They were killed about forty hours afterwards, and numerous dark-red pneumonic infiltrations observed. It should be noted that in these various experiments with smaller animals, control injections were made with harmless fluids, such as sterilized water, and no changes were subsequently observed.

Mice were also exposed to the spray of culture liquid. These became very ill, and were killed in three days. The lungs of all mice were more or less affected with pneumonia.

Finally, 100 head of cattle inoculated with cultures of this coccus resisted lung plague in infected localities.

* Fortschritte d. Med. (1886), IV., S. 217.

In summarizing the results of their work, the authors are disposed to conclude that this coccus represents the cause of contagious pleuro-pneumonia.

It is evident that the frequency of bacteria in lungs affected with this disease should make us careful not to interpret all the various appearances of interlobular disease occurring in contagious pleuro-pneumonia, as due to its specific cause alone until more information has been gathered.

The presence of these bacteria usually in pure culture in broncho-pneumonia, with or without interlobular disease, is demonstrated by the following bacteriological studies upon lungs which have been already briefly described in foregoing pages:

Lungs of Case A (see page 122).—From tissue involved in recent red hepatization, two agar plates (A, B) were prepared by inoculating A with a small particle of lung tissue. This was obtained by thoroughly scorching the pleura, and removing a particle from within and beneath the scorched area with flamed forceps and scissors.*

On plate A only ten colonies appeared—all alike. The surface colonies, after three to four days, were 4 to 5 mm. in diameter, round, convex, grayish, glistening. They were made up of very minute bacteria, identical with the pneumonia bacteria. They showed distinctly a capsule in the hanging drop.

January 28. A rabbit was inoculated by placing a particle of agar growth derived from a colony on this plate under the skin of the ear.

January 30. Rabbit very quiet; ear drooping.

January 31. Quite sick; head resting on floor of cage.

February 2. Dead this morning. On the ear a spot about 1 inch in diameter, in which the skin is infiltrated with pus and dotted with ecchymoses. Very slight peritoneal exudate in the form of fibrils of coagulated lymph across coils of intestine. Spleen large, dark red, and still firm. Kidneys hyperæmic. Lower colon hemorrhagic. Lungs very œdematous, with dark red foci. In both blood and spleen a very large number of bacteria, showing very well the polar stain with alkaline methylene blue. Agar tube cultures from blood and spleen both contained on the following day a rich, shining, grayish growth of the inoculated bacteria.

At the same time that the agar plates were prepared two peptone bouillon and one agar tube were inoculated directly from the lung tissue, either by adding some serum or some tissue obtained as described above. In these three tubes only the pneumonia bacteria subsequently appeared. A rabbit inoculated subcutaneously with a particle of lung tissue died in three days. The lesions were nearly the same as those described for the rabbit inoculated with the pure culture, slight peritoneal exudate in the form of fibrils of pale coagulum, enlarged, dark spleen, and œdematous, hyperæmic lungs. At the point of inoculation slight suppurative infiltration of the skin and subcutis. In stained preparations of blood and spleen pulp numerous minute oval bacteria, showing the polar stain distinctly. An agar and a bouillon tube inoculated with blood from the heart, and two similar tubes inoculated with spleen pulp, contained subsequently only the pneumonia bacteria. From the area of yellowish hepatization in the median lobe plate cultures (A, B) were prepared. Only one colony, composed of streptococci, appeared on A.

An agar tube inoculated directly from the same region contained one colony of motile bacilli. A bouillon culture inoculated in the same way contained only the pneumonia bacteria.

From the emphysematous interlobular tissue several tubes were inoculated as follows:—

The still intact pleural covering was scorched away with platinum spatula, and from the little serum in the cavities thus exposed two agar and two bouillon tubes were inoculated with platinum loop. One agar and one bouillon tube remained permanently free from growth. One agar tube contained subsequently a viscid, orange-colored growth in condensation water made of micrococci. One bouillon tube contained motile bacilli.

In order to test the pathogenic power of the pneumonia bacteria on cattle the following experiment was made:—

On March 16, from the culture derived from a colony of the lung plate, and passed

* The method used largely by German pathologists and bacteriologists of cutting into the lung tissue successively in different planes with different sterilized knives seems to the writer less safe, because the farther we go toward the root of the lung the more liable we are to cut large air tubes, and thus increase the chances of dragging bacteria from these over the cut surface.

through a rabbit, a flask of peptone bouillon was inoculated, and placed in the thermostat. On the day following the bouillon, now uniformly clouded, was used to inoculate two young animals. Calf No. 84, about 11 months old, received 7 c. c. of the culture liquid into the lungs through the right chest wall. Cow No. 154 received the same quantity into the trachea in the region of the neck. No. 154 did not become sick. No. 84 was found dead early on the morning following the injection, that is, in about sixteen hours. At the autopsy the following pathological changes were observed: Nostrils filled with reddish foam, and on moving the animal a considerable quantity of blood flows from them. Trachea and bronchi contain a frothy, blood-stained liquid, and the mucosa is intensely reddened. The lungs partly collapsed when the thoracic cavity was opened. Both more or less hyperæmic. The various lobes of the right lung show occasional subpleural petechiæ. The two small cephalic (or anterior) lobes are very much congested, and from the cut surface a considerable quantity of frothy liquid escapes. In the caudal lobe about 2 inches from the cephalic edge and 1½ inches from the lateral edge is a firm, dark red hepatized hemorrhagic mass involving several lobules, and extending from convex to diaphragmatic surface. This is evidently the point where the needle entered the lung tissue. In the left lung, near the caudal border of the principal lobe, a group of lobules in condition of bright red hepatization surrounding the terminal portion of the left bronchus. Bronchial glands in part hemorrhagic. Extensive ecchymosis of the pericardium, slight extravasation on left auricle and ventricle. Large patches of extravasation on pulmonary artery and aorta. Heart cavities empty, the still liquid blood having escaped through the previously cut vessels. Spleen congested, dark red in color; under capsule a few hemorrhages. Other organs not markedly affected.

Lung No. 30 (see p. 122).—Cultures were made on inclined agar from the interlobular exudate as follows:—

Nos. 1 and 2 from interlobular exudate of left caudal lobe, two different regions.

Nos. 3 and 4 from interlobular tissue of left ventral lobe.

No. 5 from interlobular exudate of right caudal lobe.

In all these tubes an abundant grayish growth appeared on the inclined agar the next day. In all but No. 2 only pneumonia bacteria could be detected. In this latter tube a motile bacillus was likewise present.

At the same time two agar plates were prepared from a bit of interlobular exudate from right caudal lobe. On the first plate only four colonies appeared, which were all found to be made up of pneumonia bacteria. On the second plate two surface colonies appeared, made up of large cocci and tetracocci respectively. Both were probably aerial in origin.

Two agar plates were also prepared from a bit of the hepatized parenchyma of the right ventral lobe. On the first plate only two colonies appeared, one made up of pneumonia bacteria, the other (yellowish) of micrococci. On the second plate several colonies, probably of aerial origin, appeared.

With a bit of tissue from the left caudal lobe a rabbit was inoculated under the skin of abdomen. It died in twelve days. There was locally quite extensive suppuration and suppurative pericarditis and pleuritis with grayish-red hepatization of the small cephalic lobes of the lungs. Cultures from this exudate remained sterile.

Another rabbit inoculated subcutaneously with a loop of an agar culture derived from a colony on the first set of agar plates died in four days. At the place of inoculation the skin and subcutis was infiltrated with pus. There was exudative peritonitis indicated by a marked ecchymosis of and a viscid pseudo-membrane on the large intestines, and by an exudate on liver and spleen. The exudate composed of fibrin, leucocytes, and immense numbers of bacteria, which in agar cultures prove to be the ones inoculated.

Lung No. 46 (see p. 123).—Sections stained with aniline water, methyl violet, and decolorized in one-half of 1 per cent. acetic acid were negative as regards the presence of bacteria. This is not surprising, because the demonstration of bacteria among the dense mass of leucocytes is well-nigh impossible without decolorization, and this is apt to decolorize the bacteria as well. Moreover, the presence of fibrin is associated with an abundance of granular precipitate. Again, the small number of bacteria which appeared in the cultures shows that living individuals were very scarce in these lesions. The cultures described in the text were from the following sources:—

1. A piece of interlobular exudate from right principal lobe on inclined agar.

2. A piece of the parenchyma from the same region. On the following day an abundant surface growth and turbid condensation water containing only pneumonia bacteria on microscopic examination.

3. A piece of tissue, including both parenchyma and interlobular tissue from another region on the same lobe on inclined agar.

4. From the same locality a small particle of the parenchyma on agar.

On both tubes 3 and 4 a few isolated colonies of pneumonia bacteria appeared on the following day.

5. A piece of interlobular exudate from the ventral aspect of the left principal lobe on inclined agar.

5a. A loop of the condensation water from tube 5 rubbed on inclined agar.

In tube 5 about 12 colonies appeared on the following day; in tube 5a only 1 appeared.

6. A piece of interlobular exudate with some parenchyma adhering, from the right ventral lobe, ventral aspect.

6a. Dilution of 6 as 5a of 5.

On tube 6 a considerable number of colonies appeared on the inclined surface. Tube 6a remained sterile. In these various cultures only pneumonia bacteria were found. Two rabbits were inoculated subcutaneously with bits of tissue from the left caudal lobe. In both the temperature had risen to 104·2° and 104·8° F. on the fourth day. They slowly recovered and were chloroformed on the sixteenth day. Marked local subcutaneous suppuration was found at the place of inoculation, but the internal organs were free from microscopic changes.

Lung No. 47 (see p. 124).—Cultures all made on inclined agar in tubes.

Tube 1. Inoculated with a small piece of the parenchyma from left ventral lobe.

Tube 2. Inoculated from preceding with loop.

Tube 3. Inoculated with a small piece of parenchyma of right ventral lobe.

Tube 4. Inoculated from No. 3.

In Tube 1 a confluent growth appeared, while in Tube 2, inoculated from this, about six isolated colonies of pneumonia bacteria appeared. In Tube 3 a similar confluent growth of apparently only this organism appeared, while Tube 4, a dilution of No. 3, remained sterile.

The following case is one of interest; although, unlike the three reported above, there must remain some doubt as to the contagious character of the disease, especially since the entire lungs were not accessible to inspection:

Case 8, *March* 28, 1889.—Portions of the lungs of a cow sent from New York. The cow is supposed to have calved several weeks ago. Was killed March 25. It was stated that three others in the herd showed the same condition of the lungs. The lesions are limited chiefly to the pleura and interlobular tissue. On the pleura are patches of an elastic membrane, peeled off with some difficulty, one-sixteenth of an inch thick. The interlobular tissue is thickened into bands one-sixteenth to one-fourth of an inch wide. The thickening is due to exudative layers on the contiguous faces of the lobules. Between these layers and forcing them apart are round and elongated masses of a firm yellowish-white exudate, which may be lifted out without difficulty, leaving the bands in a honeycombed condition. The lumps thus removed are so firm that they can scarcely be crushed with forceps. When rubbed on cover glasses, dried, and stained with aniline colours, a large number of leucocytes appear, among which are very many exceedingly small cocci, some showing the polar stain distinctly. These plugs vary in size from a pin's head to a large pea. They are not always opaque, yellowish-white, for in some places, on sections, the thickened, whitish sides of two consecutive lobules inclose between them a translucent, rather soft, gelatinous exudate easily crushed with the forceps. The interlobular tissue of all the lung tissue brought to the laboratory was in this condition. A portion of the lung tissue is also affected with broncho-pneumonia.

Portions hardened in alcohol were examined under the microscope. The interlobular exudate consisted of two distinct masses. The external layer was made up of interlacing fibrils of fibrin and very few cells. The inner mass of nucleus consisted almost exclusively of densely packed clumps of leucocytes. The sections when stained in alkaline methylene blue showed this condition very well. The nucleus of deeply stained cell masses is surrounded by a very clearly defined zone of unstained material representing the fibrin. Outside of this zone are the boundaries of the lobules. In other words, the lymph spaces have become the seat of multiple abscesses.

Cultures were made from the interlobular exudate as before. The media used were agar and peptone-bouillon. Owing to the very feeble precarious growth on gelatin of the cocci found in cases 1 and 2 and subsequently, gelatine was not employed. In the cultures the pneumonia bacteria, a streptococcus, and a motile bacillus appeared. At the same time two rabbits were inoculated by placing bits of the exudate from the lungs under the skin. Both rabbits died from the effects of the inoculation, one in less than twenty hours and the other in forty-eight hours. The local lesions were slight. There was no peritonitis. In the spleen of both animals are numerous cocci identical with those found in sections of the cow's lung and in cultures therefrom. From spleen and blood of both pure cultures of the cocci were obtained.

In order to test the pathogenic nature of this germ more fully, some other animals were inoculated. Two pigeons received each (on January 5) one-half of a cubic centimeter of a bouillon peptone culture, one subcutaneously, the other superficially, into the pectoral muscle. Both remained well. Two mice, on the same day, were inoculated subcutaneously, each with one-twelfth of a cubic centimeter of the same culture. One mouse died on the following day, with no bacteria demonstrable in spleen or blood under the microscope. The other remained well.

From agar cultures the growth was removed and suspended in sterile water until a turbid, whitish liquid was formed. Of this liquid 2 c.c. was injected into the lungs of a heifer through the chest wall. Within half-an-hour the breathing became labored, and continued so until late at night, the injection having been made at 5.30 p.m. It was found dead and still warm early next morning. There were found, on *post-mortem* examination, extensive subpleural extravasations on the ribs of both sides, on the epicardium, endocardium, and diaphragm. Lungs very hyperæmic, bronchial glands with deeply reddened cortex. Extravasations also found on omentum and peritoneal covering of the abdominal organs.

In the two following cases, evidently not contagious pleuro-pneumonia, only portions of the lungs were accessible. The same bacteria were isolated from them.

February 25, 1890. Portion of a cow's lung was received from Baltimore, Md., in good condition. Two distinct stages of the disease are represented, a dark red, firmly hepatized, and a pale red œdematous region, distinct and sharply defined from one another. The pleura over the œdematous region shows interlacing grayish bands, which are subpleural whitish thrombi in the lymph spaces. By tearing away the pleura these thrombi are easily lifted out. Over the hepatized portion the pleura is thickened, but the subpleural mottling is the same.

On cutting into the œdematous portion much serum collects in the incision and speedily coagulates. The interlobular tissue is broadened and contains whitish lymph thrombi, easily removed. Some are as large as split peas. When crushed and examined in salt solution, as well as after staining, many leucocyte elements observed. The minute bronchi contain pale coagula, which can be pulled away as long elastic, sometimes forked, cylinders.

The hepatized portion is firm, the lobules dark red, surrounded by the interlobular spaces distended with whitish plugs. The condition of the interlobular tissue and of the minute bronchi is the same as in the œdematous portion. Fresh sections of this tissue show the redness to be due largely to the alveolar capillaries overdistended with red corpuscles. The alveoli are filled with cellular elements containing fat granules. Red corpuscles are few in number. The larger bronchi contain some serum. The mucosa faintly discolored.

In sections from material hardened in alcohol and stained in various ways the following features were observed: In that portion of the lungs which, in the fresh condition, appeared to be in a state of inflammatory œdema, the walls of the alveoli are somewhat broadened and more approximated than in normal lung tissue compared with it. Occasionally cell masses are seen in a single alveolus, or perhaps two or three together, and in the smallest air tubes. But these cell masses are small and do not fill the lumen of the tube or cavity containing them. The interstitial tissue is to a moderate extent distended with a finely granular material mingled with cells.

In the hepatized portion the alveoli are distended with fibrin and cell masses. Those containing cells chiefly appear in the sections as foci of variable dimensions, some of which stand in direct relation to bronchi which are densely packed with cells. Such bronchi are, in the sections, about 0·15 mm. in diameter. Surrounding these foci the alveoli are filled chiefly with fibrin containing a few cells. The peribronchial tissue is not infiltrated, and it seems as if the bronchioles were filled by cellular exudate coming from the alveoli.

The interlobular tissue is fully distended and the various lymph spaces filled with a meshwork of very delicate fibrils. In this meshwork cellular elements are scattered throughout in small numbers, not localized anywhere. There is as yet no formation of connective tissue visible.

From the hepatized portion cultures were made in the following manner:

The pleura was thoroughly scorched and in this scorched area a piece of lung tissue cut out with flamed scissors. From this hole another piece was cut out and stirred up in melted agar. In transferring to a second tube of melted agar the bit of lung tissue clung to the wire and was transferred. The two plates thus prepared showed on the following day large numbers of identical colonies, which were made up of minute coccus-like forms

showing a distinct capsule in the hanging drop. From one of these plates a peptone bouillon and an agar tube were inoculated. The bouillon was faintly clouded next day with minute, nonmotile bacteria. In the agar tube only the condensation water contained any growth which was composed of the same bacteria.

While the agar plates were being prepared, a bouillon and an agar tube were inoculated directly with a loop of serum from the depths of the hole cut into the lung tissue. The bouillon became clouded on the following day with the same bacteria. On the agar surface a rather abundant grayish growth of the same organism appeared. In neither tube could other bacteria be detected.

From the œdematous portion plate cultures were prepared in the same manner; on Plate A, about forty colonies, about half of these covered by a surface of viscid consistency and made up of plump bacilli in chains not exhibiting any movements. The deep colonies are composed of plump, short, motile bacilli. Second plate similarly overgrown. The motile bacillus was subsequently found to be spore-bearing and to liquify gelatine. While making the plate cultures, a peptone bouillon and an agar tube were inoculated directly with a loop of serum. Both remained sterile.

From the same portion kept in the refrigerator for twenty-four hours another set of agar plates were prepared. Plate A was completely overgrown on the following day with the same bacillus. Beneath this growth about thirty deep colonies are visible. Two of these, examined by carefully scraping away the surface growth, were found to consist of the minute bacteria showing capsules. Plate B remained sterile.

At the same time that cultures were being prepared two rabbits were inoculated subcutaneously with particles of hepatized lung tissue. Both were found dead within forty hours. In one animal there was some hyperæmia and ecchymosis in the subcutis at the place of inoculation with slight purulent infiltration; spleen engorged; invagination of lower portion of colon. In cover-glass preparations from spleen, liver, and blood bacteria with polar stain and closely resembling swine-plague bacteria present. Cultures in agar, gelatine, and in bouillon developed within twenty-four hours, all containing the same oval, nonmotile bacteria. In the other animal the *post-mortem* appearances were the same, but there was no invagination. Cultures also were the same.

One rabbit which received subcutaneously one-fourth of a cubic centimetre of a bouillon peptone culture from preceding rabbit died within twenty hours; considerable extravasation at point of inoculation in subcutis. From an agar culture of the foregoing rabbit a fresh rabbit was inoculated with a loop inserted under skin of ear. This rabbit succumbed on the fifth day; at the point of inoculation a small abscess; fibrinous and cellular exudate on peritoneum and pleura containing large numbers of the oval bacteria; cultures on agar and in bouillon confirmatory.

February 20, 1891. Portions of diseased lung tissue from a cow were received to-day from New York. The portions sent are evidently the smaller ventral or cephalic lobes and slightly enlarged beyond the normal. The firm hepatized tissue is pale red and along the borders of the lobes there is faint yellowish mottling. The tissue gives a slight nodular sensation to the touch indicative of considerable distension of the ultimate air spaces with firm masses. They are shown to be chiefly leucocytes under the microscope; the same pale red appearance present on the cut surface, together with the localized mottling referred to. The section rapidly fills up with serum. Certain areas of the hepatized lobes also show subpleural thrombosis of the lymph spaces with greyish-white coagula, giving the particular area involved a mottled appearance, differing from the mottling above described. These lymph thrombi are also found in the interlobular tissue and are easily pulled out. The mucosa of the bronchi contained within the diseased lobes is intensely hyperæmic, in some places hæmorrhagic.

The bacteriological examination was restricted to some agar plates, tube cultures, and inoculation of rabbits from the hepatized lung tissue. A tube of agar was inoculated with a minute particle of lung tissue for Plate A. From this several loops were transferred to a second agar tube for Plate B and to a gelatine tube for Roll B. Both the latter remained sterile, while a large number of colonies appeared on Plate A within twenty-four hours. These were of two kinds, chiefly small colonies of capsule bacteria and a few large colonies not examined. From the same bit of lung tissue two particles were placed under the skin of two rabbits. One died in sixty hours. At point of inoculation the vessels of the under surface of skin were distended and tortuous, with extensive punctiform ecchymosis around them. In abdomen a portion of the cæcum and upper colon ecchymosed, slight fibrino-purulent exudate on coils of intestines and on liver; fatty condition of liver and kidneys; lungs normal.

In peritoneal exudate very many minute oval bacteria; in blood and spleen a smaller number. Those of the blood and spleen show the polar stain. In agar and bouillon cultures, from blood and spleen, the polar-stained capsule bacteria, and these only, subsequently appeared.

The second rabbit was found dead on the fourth day. The lesions were the same as those just described, with the exception that the peritonitis was further advanced and the various abdominal organs covered with a fibrinous and cellular membrane. The cæcum and colon were extensively ecchymosed. The bacteriological examination and the cultures gave precisely the same results as in preceding case.

Description of the Bacteria associated with Sporadic Pneumonia.

With rare exceptions only a certain kind of bacteria was encountered in the diseased lung tissue. These are closely related to the swine-plague bacteria and hence to the entire group of pathogenic bacteria denominated by Hüppe *Septicæmia hæmorrhagica.* The description which has been given for the swine-plague bacteria in the bulletin on this disease will apply to the bacteria now under consideration.

Morphologically there is no difference, excepting, perhaps, the almost constant presence of a capsule around the individual bacteria. This capsule consists of a transparent envelope around the bacillus, having the outline of the latter. I have been unable to stain it with the ordinary anilin dyes, and hence it is not brought out in stained preparations. It is not, in fact, as distinctive a part of the organism as is the capsule of the diplococcus of human pneumonia, for example. The capsule of the latter appears in dried and stained coverglass preparations of the blood and organs of inoculated rabbits ; for example, as a characteristic, unstained zone around the bacillus. I have never seen the capsule of the bacilli under consideration under the same conditions. They are, however, readily demonstrated in young cultures soon after they have been derived from the animal body. In the hanging drop, on its border, the bacteria do not touch one another, but are separated by a space of uniform width. Not infrequently the outline of some of the capsules themselves is distinctly seen. In such cases each capsule was observed to inclose a single organism, or two when in pairs. The capsule of individuals was about 1.2 μ long, of pairs about 1.6 μ. The production of this capsular substance is likewise demonstrated in unstained material from agar cultures in which the bacteria are still massed together, but in such a way as to be separated from one another by a certain uniform space.*

Nearly all cultures of the pneumonia bacteria become quite viscid with age. This likewise indicates the presence of capsules. Prolonged cultivation on alkaline substrata seems to increase the solubility of the capsular substance and make it less distinct.

The characters revealed by the cultivation of pneumonia bacteria on various substrata are more or less negative. Their growth on gelatin is feeble or else it remains entirely invisible. On agar the growth, both in tubes and on plates, in the form of colonies, is not characteristic. The colonies on the surface expand into grayish, partly translucent roundish discs of variable size, depending on the amount of moisture present. They may attain a diameter of 4 or 5 mm. In tubes, on the inclined agar surface, the growth consists of a grayish, glistening, rather fleshy layer. The deposit in the condensation water becomes dense and quite viscid after a time.

On potato no development is manifest to the eye. Milk remains unchanged even after weeks. Their resistance to destructive agents is feeble. They are to all appearances not adapted to live outside of the animal body, for they are speedily destroyed by drying, and even in cultures their life is quite short. A

* The existence of capsules around bacteria is a matter of more frequent occurrence than appears from bacteriological literature. There is evidently a great variation in the consistency of the capsular substance, in virtue of which it is readily dissolved in some species and quite persistent in others. As a diagnostic character it should not be lost sight of, for its presence seems to be linked to certain groups of bacteria.

dried-out culture contains no longer living bacteria, and even in those not dry, the majority of the bacteria are no longer alive after a few days.

Biochemical characters.—Like the swine-plague bacteria, they produce phenol. A copious precipitate of tribrom phenol may be obtained by adding bromine water to the distillate from peptone bouillon cultures several weeks old. The indol reaction is variable, usually not obtainable. Toward sugar, this group of bacteria, including the swine-plague bacteria, have a peculiar action which should always be investigated when any doubt exists as to the nature of the culture under observation. In bouillon this group acts upon dextrose and saccharose, with the appearance of acids in the fluid, but it has no effect upon lactose. With the hog-cholera group only dextrose is attacked, while both saccharose and lactose remain untouched.

Pathogenic action.—This is precisely like that of swine-plague bacteria. The virulence of many cultures obtained did not, however, rise up to the level of the virulence manifested by some races of swine-plague bacteria. Taking the rabbit as the animal most susceptible to this group of bacteria, a small quantity of bouillon (0.1 to 0.2 c. c.) proves fatal in from twenty-four hours to seven or eight days. The rapidly fatal disease is characterised by no marked changes in the animal and the blood is full of the inoculated bacteria. As the diminished virulence lengthens the period of disease, exudates appear locally in the peritoneal, the pleural, and the pericardial cavity in a certain sequence fully discussed in another publication.*

The lungs are sometimes attacked from the pleura secondarily. In these cases the bacteria are few in the blood and very numerous in the exudates, which consist at first mainly of fibrin, later of leucocytes.

The action of the pneumonia bacteria on calves has been shown in the preceding pages to be not infrequently followed by speedy death when the culture fluid is injected into the thoracic cavity. Injections intratracheal and subcutaneous did not produce any recognizable effect.

The great similarity between these bacteria and those associated with pneumonia in swine (swine-plague) led to the following experiment :

June 5, 1889, the growth on four agar cultures, about 4 days old, was removed and shaken up in distilled water. The milky, turbid liquid thus produced was used to inoculate three pigs. One and one-half cubic centimeters was injected through the walls of the thorax into the lungs of one pig, the same quantity into the abdominal cavity of a second, and beneath the skin of the third pig. There was no decided effect from any of these inoculations. November 16, nearly five and one-half months later, the pig which had been inoculated in the lungs died from the effects of another experiment. Both lungs were everywhere adherent to the walls of the thorax, the diaphragm, and the pericardium by means of very fine fibrous bands. The pericardium was firmly adherent to the heart. On the lateral border of the right principal lobe a tumor as large as a hen's egg was inseparably adherent to the lung tissue. The wall was one-eighth of an inch thick, inclosing a dry, cheesy mass of pus.

Owing to the great prevalence of this pathogenic species of bacteria and its importance as a disease producer in domestic animals, a synopsis of the most prominent characters are reproduced, with some additions, from the author's report on swine-plague.

(1) Bacteria about 1 μ long and 0.5 to 0.6 μ wide. Size somewhat variable in different culture media.

(2) They show the so-called polar stain in coverglass preparations from tissue, rarely in preparations from cultures.

(3) Nonmotile. (This nonmotility is an important character frequently misinterpreted as motility, because in the hanging drop a peculiar jerky or dancing motion is noticeable.)

* The variability of infectious diseases as illustrated by hog cholera and swine plague, by Theobald Smith and Veranus A. Moore. Bulletin No. 6 (1894) of the Bureau of Animal Industry.

(4) Growth in bouillon feeble. Deposit nearly always viscid in older cultures.
(5) Growth in gelatin very feeble or absent.
(6) Growth on potato fails.
(7) Does not produce gas in presence of carbohydrates. Produces acids in presence of dextrose and saccharose, but not in presence of lactose.
(8) Produces phenol; presence of indol variable.
(9) Very vulnerable. Rapidly destroyed in water, soil, and when dried.
(10) Multiplies diffusely in blood (virulent) or on serous membranes of rabbits (attenuated), with production of exudates.

Epizootics of Infectious Pneumonia.

In the foregoing pages only sporadic pneumonia has been considered. Outbreaks of pneumonia which spread to other animals in a herd, or from one herd to another, have not been studied by the writer. Such outbreaks are however, very rare, and deserve a brief notice here, as they also are likely to be mistaken for contagious pleuro-pneumonia by inexperienced persons. In dealing with sporadic pneumonia, it is maintained that the associated bacteria were secondary causes, and that the primary causes were injuries of one kind and another. When pneumonia spreads from animal to animal, bacteria are undoubtedly the primary cause, and in accordance with accumulated knowledge we must regard such bacteria as endowed with a relatively high degree of virulence.

In 1886 J. Poels described an infectious disease among calves which he denominates septic pleuro-pneumonia. The disease was fatal in fifteen to twenty hours. In a few cases recovery ensued. At the autopsy the lungs were diseased and in appearance resembled those of pleuro-pneumonia. The costal pleura was ecchymosed and covered with fibrinous exudate. The pleural cavity contained a considerable quantity of straw-coloured coagulable lymph, in one case clouded, purulent. The lungs were involved in lobar pneumonia. In three cases the anterior lobes (ventral and cephalic), in a fourth the posterior (principal) lobe, were hepatised. Abundant lymph flowed from the surface, and fibrinous coagula were found in the smaller bronchioles. The author adds that there was nothing to differentiate these cases from contagious pleuro-pneumonia. There was also present a fibrinous deposit on the pericardium and serous exudate within it. In three cases killed when the disease was at its height, the thoracic organs were scarcely at all affected. However, the spleen was enlarged, the liver friable, the peritoneum clouded. In those which died the blood vessels of the skin were distended with fluid blood. In those which were killed the blood coagulated normally.

In the lungs the pleural and pericardial exudate, bronchial glands, liver, spleen, kidneys, and blood a large number of very small, ovoid, rod-like bacteria were detected, which stained easily. There were always a few distinctly rod-like bacteria present, which the author states are similar to those of mouse septicæmia. They were cultivated without difficulty in the thermostat on agar and in bouillon.

Rabbits and guinea pigs died fifteen to sixteen hours after inoculation of culture liquid into the lungs, with exudate pleuritis, pericarditis, and more rarely pneumonia. Subcutaneous inoculation killed a rabbit in thirty hours. A calf 13 days old died twenty hours after intrathoracic inoculation with pneumonia and exudate pleuritis. A calf 11 months old died 66 hours after intrathoracic inoculation of culture liquid from extensive pleuro-pneumonia. Similarly a calf seven weeks old died in 54 hours after intratracheal injection of the culture liquid and with the same pathological changes.

It is highly probable that Poels had before him the bacteria I have described above. The lesions which he describes could not have been produced by the mouse septicæmia bacilli, as they do not produce serous exudates at any

time. The lesions described correspond closely to those produced by the pneumonia bacteria or the swine-plague group.

C. O. Jensen* describes an epizootic among calves in Jutland which is of interest in this connection. In a herd of 200 head of cattle about 16 calves died twelve to twenty-four hours after the first symptoms of disease. These were chiefly high fever and diarrhœa. At the autopsies a few calves were found affected with a recent, severe fibrinous pleuritis and pericarditis and a gastroenteritis. In one case a rather firm, œdematous swelling appeared on the under surface of the neck. In the spleen of one of the calves minute ovoid bacteria were found, which stained only at the poles. They killed rabbits and mice, after subcutaneous inoculation, in twelve to thirty-six hours.

In another herd the same rapid mortality among calves appeared. The lesions were more of a septicæmic character and associated with the same bacteria in the organs as described above.

In a third outbreak the lesions in the calves were, in addition to enlargement of the spleen and changes of the blood, gelatinous infiltration around pharynx and larynx, and more rarely a phlegmonous inflammation of the posterior regions of the mouth. The same bacteria were found in this outbreak. These bacteria Jensen identifies as belonging to the swine-plague group, both in morphological and pathological properties.

The author made additional inoculations into animals, which are of interest. In a dog, a colt, and two pigs 3 to 4 months old subcutaneous injection of cultures of these bacteria caused more or less local inflammation. In the dog and colt it disappeared. In the pigs it terminated in abscesses. A guinea pig died eight days after subcutaneous inoculation, with extensive phlegmonous inflammation. Two pigeons resisted subcutaneous inoculation. Of seven fowls inoculated, only one died in eleven days. Rabbits were most susceptible, for they died in from ten to twenty-four hours after inoculation; gray and white mice in twenty-four to forty-eight hours.

The relation of these bacteria to the disease was tested on two calves. One 4 to 5 weeks old was inoculated subcutaneously with a few drops of rabbit's blood containing the bacteria diluted in water. The calf became very sick within fourteen hours. It showed great prostration with high temperature and feeble pulse. A considerable swelling appeared at the place of inoculation. It was found dead thirty-six hours after inoculation. The chief lesions were those produced locally in the neck by the inoculation, fibrinous pleuritis, and hyperæmia of the intestines with occasional hemorrhages.

A second calf inoculated in the same manner from an agar culture showed the same symptoms, but finally recovered. An extensive inflammatory swelling on the neck, due to the inoculation, turned into an abscess. This same calf, previously fed with the blood of the preceding calf, and a pig fed with the viscera of several inoculated rabbits did not show any disease subsequently.

These observations of Jensen's are very important in demonstrating the existence of races of the swine-plague group which may produce epizootics of a serious and fatal character. The abstract given leaves no doubt as to the nature of the bacteria found. It is of interest to note in some of the affected calves inflammations of the back of the mouth and around the pharynx and larynx, as if the bacteria entered the mouth first and thence penetrated into the connective tissue. It will be remembered that attenuated varieties of this bacterium are present in the mouths of cattle.

*Ueber eine der Rinderseuche ähnliche Kalberkrankheit. Monatshefte fur praktische Thierheilkunde (1890), II, p. 1.

Perroncito* has described an infectious pneumonia among calves and young pigs. The pneumonia is of the more chronic catarrhal type. The youngest are most susceptible, and with them the disease is most fatal. At the autopsy the lesions are limited chiefly to the small anterior (ventral and cephalic) lobes and represent a true broncho-pneumonia. Subsequently Perroncito described as the cause of this disease a micrococcus (*M. embratus*) which stains gelatin and agar cultures amber yellow.

Immingert gives a brief account of an infectious pneumonia among calves which runs a more chronic course, with fever, great emaciation, cough, and fetid discharge from the nostrils. The disease was introduced by calves brought from another place by dealers and sold singly or in pairs.

Septic pleuro-pneumonia in calves has also been observed by E. Lienaux‡ in Belgium, who describes the lesions found in one case and the bacteria associated therewith. In this case the anterior lobes of the lungs were hepatized and of a dark red, brown, or violet hue. The interlobular tissue was also affected. "Thick connective-tissue bands separated the different diseased lobules. The bands were œdematous, of a white or yellowish color, and from them flowed a clear serum. Distended lymphatics were noticed in them, full of lymph and fibrinous plugs." The further description of the lung lesions gives rise to the suspicion that it may have been a case of contagious pleuro-pneumonia grafted upon a slight broncho-pneumonia.

The bacteria isolated from these lungs and there present in large numbers are evidently identical with the pneumonia bacteria. They are described as motile; yet this mistake or misinterpretation has been made so often that this apparent difference may be safely disregarded. The inoculation experiments correspond closely to those of Nocard's and ours. Calves succumbed to intrathoracic inoculation in twenty to sixty-six hours and "on examination presented the lesions of septic pleuro-pneumonia."

Preusse§ reported an outbreak of some infectious disease among calves which he regarded as possibly transmitted from swine which had been dying from swine erysipelas or *Rothlauf*. The evidence that the swine disease was swine erysipelas and not *Schweineseuche* (or swine plague) is not presented, and judging from the brevity with which the bacteriological facts are disposed of with regard to the cattle disease, we must, to say the least, refuse to accept the positive statements of the author.

The disease attacked chiefly young animals 6 to 12 months old and was very rapid in its course. Four days after its appearance it had again disappeared. Nine animals became diseased and only one recovered. The disease began with dulness and loss of appetite. The calves lay down much of the time and soon stopped ruminating. There was considerable fever (104° to 106° F.), rapid, feeble pulse, constipation, and in some cases tympany. The disease usually terminated fatally twenty-four hours after the appearance of the first symptoms. In a certain number of the affected calves an œdematous swelling appeared around the pharynx aud larynx, which was associated with foaming at the mouth and difficult breathing, finally terminating in death by suffocation. The autopsy gave evidences of an acute infectious disease, and in the blood and local swelling

* Il Medico veterinario, 1884. From a review in the Journal de Médecine Vétérinaire, April, 1885, p. 210.

† Ueber eine infektiöse Kälberpneumonie. Wochenschrift f. Thierheilkunde u. Viehzucht, 1891, S. 213-217.

‡ The Veterinary Journal, XXXV. (1892), p. 415.

§ Rothlaufartige Infectionskrankheit bei jungen Rindern. Zeitschrift f. wiss. u. prakt. Thierheilkunde, XIII. (1887), S. 450.

the author found bacilli resembling those of rouget. In one case there was found a severe peritonitis.

The evidence in this paper is incomplete, and the facts could apply to the pneumonia bacteria as well as to rouget bacteria. The latter have not thus far been accused of attacking the bovine species, excepting by Poels, quoted above, whose statements are equally ambiguous. Other outbreaks of diseases probably due to the same group of bacteria, which have been briefly abstracted in the bulletin on swine plague, are those of wild seuche and a buffalo plague.

Some years ago F. S. Billings described a disease among cattle which he dominated cornstalk disease, and in which lung disease was supposed to play a prominent part. As to what the cornstalk disease really is has been investigated by Dr. V. A. Moore for the Bureau of Animal Industry (Bulletin No. 10, 1896), and I therefore shall only refer to it here in so far as the descriptions of Billings have made pneumonia one of the prominent features.

This terminology had even penetrated into Europe and had been accepted in good faith by those who were unable to investigate the subject themselves, so that when a few head of cattle imported from America into France were found affected with pneumonia the disease was promptly described as the cornstalk disease, *i.e.*, it was stamped as something peculiar to this country, when, as the preceding pages clearly show, the same agent causing lung disease in cattle had been described not only as existing in various parts of the Continent, but as producing general outbreaks, especially among the younger animals. The circumstances connected with the so-called American cornstalk disease in France are given by E. Nocard in brief as follows :*

On November 15 and 16, 1890, four head of cattle imported among 400 head from Indiana and Illinois into France were found affected with lung disease. One died and three were slaughtered. At first there was suspicion of contagious pleuro-pneumonia, but this was dispelled by a careful examination. The disease during life was marked by a very high temperature (108° F.), depression, weak and abortive cough. A careful examination of the lungs of the slaughtered cases yielded the following description: At first sight, a section of the hepatized tissue presented the appearance of a recent pleuro-pneumonic lesion. The tissue is dense, firm, compact, friable, varying in color from a light red to a deep brown, or nearly black. The lobules are separated from one another by broad connective tissue band, infiltrated with a considerable quantity of yellow limpid serum. An attentive examination sufficed to reveal notable differences between these lesions and those of pleuro-pneumonia.

The infiltration of the connective tissue is less abundant, the serum less albuminous, less limpid. Here and there pressure forced from the overdistended lymphatics small white fibrinous concretions, smooth, of firm consistency. The lobule imprisoned in this inclosure of connective tissue, so unusually thickened, has not the uniformity of tint or of consistency which characterises the pleura-pneumonia lesion. It is firm and more manifestly hepatized in the centre than in the periphery. The lesion proceeds from the bronchus and not from the perilobular tissue. In pleuro-pneumonia it is the opposite. There one finds, where the lesion is very recent, lobules in which the tissue is very dense and blackish at the periphery, while at the centre it is still rosy and permeable.

Another important differential sign: Pressure causes a notable quantity of thick, viscid, yellowish-white muco-pus, quite like that observed in certain forms of verminous bronchitis, to exude from the air tubes. A preliminary microscopic examination permits us to eliminate this hypothesis. The muco-pus of the bronchi, the scrapings of the hepatized tissue, contains neither ova, nor embryo, nor worms of any kind.

An incision into the bronchi shows that the mucosa is inflamed, thickened, the epithelium more or less desquamated. The submucous tissue is always infiltrated with serum, acquiring sometimes considerable thickness. On the other hand, this muco-pus of the bronchi contains in abundance a short, ovoid, motile, bacterium, which seems to be present to the exclusion of all other microbes. This bacterium is also found in veritable pure culture in the hepatized tissue, and above all in the limpid serosity which distends the perilobular lymph sacs.

* *Recueil de Méd. V.*, (7 ser.), IX., 1891, pp. 424—429.

This single character suffices to demonstrate that the lesion in question is not pleuro-pneumonic in nature. It is known that the pleuro-pneumonia serum is extremly poor in bacteria, and that if one collects it with precaution against contamination from the infiltrated connective tissue septa it ordinarily is sterile.

I have quoted from this communication of Nocard's, since it aroused considerable unnecessary attention at the time because of its supposed relation to a so-called specific cornstalk disease in this country, and because of its resemblance to contagious pleuro-pneumonia.

The cursory examination by Nocard showed it to be an aggravated form of broncho-pneumonia associated with the bacteria I have described in these pages. Its existence in four animals may be accounted for perhaps by an increased virulence of the bacteria associated with a similar exposure of these animals on the journey. That the virulence was quite high is shown by Nocard's reports of his inoculated experiments. Mice, rabbits, guinea-pigs, and even pigeons succumbed in less than forty-eight hours to small subcutaneous doses of the serum. A calf eight months old and a ram of two years, which received an intrathoracic injection of a little peritoneal exudate from a guinea-pig, died within forty-eight hours with fibrinous pleuritis and exudative broncho-pneumonia. It will be noted that Nocard describes these bacteria as motile. This made it at first impossible to identify the bacteria found by him and the pneumonia bacteria. This difficulty was overcome by a study of one of Nocard's cultures, which demonstrated the identity of the organism as found in this country with that found by Nocard in France. The following notes show that the foreign culture has retained much of its original virulence :

Through the kindness of Professor Nocard cultures of the bacteria found by him were sent to the Department and handed to me by Dr. Salmon for examination on January 22, 1892. The bacteria were contained in pipettes sealed in the flame. Two contained bouillon, the third the blood of a guinea-pig which had succumbed to inoculation into the abdomen in eighteen hours. Of these one bouillon culture and the blood were examined.

From the bouillon culture, agar and bouillon tubes were inoculated directly. The bouillon became faintly and uniformly clouded, and contained very minute oval bacteria which were nonmotile, but which showed very active Brownian (dancing) movement. In the hanging drop on its edge the accumulated bacteria show a distinctly polar arrangement of the protoplasm. In the agar tube a considerable number of isolated colonies appeared. They were round, slightly convex, of a grayish, partly translucent, appearance. The condensation water was quite turbid and became later on viscid. The bacteria in it appeared like very minute cocci.

A rabbit inoculated subcutaneously with a loop of the condensation water, died in twenty-five hours. The various organs contained a large number of oval bacteria, many of which showed the polar stain characteristic of this group of bacteria.

On January 26 the pipette containing the blood was opened, and three agar plates prepared from a loop of blood, a microscopic examination of which had revealed a large number of minute oval bacteria. The colonies which developed on the plates were all identical in appearance, the bacteria composing them evidently identical with those in the bouillon culture. From a colony an agar tube was inoculated January 27, and on the following day a rabbit inoculated subcutaneously on abdomen with a loop of the resulting growth : Temperature 105.7° F. on January 29, 4 p.m. ; 104.2° F. on January 30, 10 a.m. The rabbit was found dead January 31. The local lesion and the exudative peritonitis were the same as those of the preceding rabbit. Similarly there were immense numbers of bacteria in this exudate. Cultures therefrom contained the injected bacteria only. A final test of the virulence on rabbits was made February 18. On this day a bouillon culture, twenty-four hours old, inoculated from the same agar culture from which the preceding rabbit had been inoculated, was injected in doses of 0.1 cc. under the skin of two rabbits. Both succumbed in thirty-six and forty-eight hours respectively. The former had, in addition to a slight local suppuration, an engorged spleen, dark liver, and œdematous and emphysematous lungs. Many polar-stained bacteria in blood and spleen. The lesions in the other rabbit differed in that peritonitis was already well-marked, and the slight exudate made up largely of bacteria. These were also present in the spleen.

Some Points of Difference between Sporadic Broncho-pneumonia and Contagious Pleuro-pneumonia.

Though contagious pleuro-pneumonia has been the object of investigation for many years, it is surprising that so little information of permanent value concerning it has been placed on record. This largely accounts for the differences of opinion entertained by those who have had most experience with this disease when it comes to make a decision as to the existence or non-existence of this disease in special cases. The most unfortunate thing, to be sure, is our ignorance of the nature of the cause, but it would seem that the gross and microscopic characters of the disease, all taken together, furnish enough evidence upon which to base a fairly reliable decision.

One of the means of enriching our knowledge on this subject would be a thorough study of bovine pneumonia in all its various phases as it occurs in our own country. Its freedom from the contagious lung disease would put the facts thus accumulated on a permanent basis. In other countries the prevalence of contagious pleuro-pneumonia makes a sharp distinction between it and sporadic pneumonia, a difficult thing, to be undertaken only by a skilled pathologist. The co-existence of contagious pleuro-pneumonia and broncho-pneumonia may be expected, and the lesions produced by each would in such cases be indistinguishable.

It is not my object here to fill up any gap in the diagnosis of pleuro-pneumonia, but simply to point out for practical use some of the differences between it and sporadic, *i.e.*, broncho-pneumonia, in the main, since an accurate diagnosis of any case of lung disease will depend upon the number of facts which can be brought together on the one side or the other.

The regions of the lungs affected serve as an important differential character. It has already been stated that broncho-pneumonia begins in the small ventral lobes, and spreads thence by the aspiration of bronchial secretions to the cephalic and the caudal lobes. More rarely, at the outset, the right cephalic lobe is affected, together with the ventrals.

Again, the disease usually affects both lungs simultaneously in the more advanced stages. In contagious pleuro-pneumonia the distribution is quite different. In many cases only one lobe is affected, usually only one lung. So far as the writer's observations go, the large caudal lobes are most frequently diseased, and the smaller lobes, when at all diseased, are usually affected by contiguity, or through the agency of extensive pleuritic exudates. Rarely does it appear that the disease began in them. This condition suggests that the inspired air is the main vehicle of the contagium, and not any fluid secretions escaping into the trachea. In a former publication* the writer pointed out that the tubercle bacilli lodge in the majority of cases in the large caudal lobes of cattle, since in these most primary foci are found. There is thus a close similarity between the distribution of the lesions in tuberculosis and in contagious pleuro-pneumonia. Both have a predilection for the main (caudal) lobes; both are unsymmetrical.

The difference between the hepatized portions in broncho-pneumonia and pleuro-pneumonia are numerous, and have been dwelt upon by most writers. They pertain to the respiring portion or parenchyma, as well as to the inter-lobular and perivascular connective tissue. The affected lobes are very large and heavy in pleuro-pneumonia; in broncho-pneumonia usually smaller than the normal collapsed lung. The cut surface in acute pleuro-pneumonia presents a bewildering variety of appearances, while that in broncho-pneumonia has a more or less uniform appearance. In the latter, the solidified

* Investigations concerning Bovine Tuberculosis (Bulletin of the Bureau of Animal Industry, No. 7), p. 90.

parenchyma is usually of a dark or light-red colour, mottled quite uniformly with pale grayish or yellowish dots, which represent the cellular infiltration within the minute air tubes, and around them in the connective tissue and the adjoining zone of alveoli. Only in certain cases upon which I have already dwelt at length are interlobular changes present which might lead to confusion. Contagious pleuro-pneumonia seems to affect primarily the connective tissue framework of the lungs, secondarily, the parenchyma itself. There is present in all cases an increase or thickening of the connective tissue surrounding the air tubes and the blood vessels, which extends a variable distance into the connective tissue between the lobules. This thickening gives rise to bands of a firm texture and pearly whiteness. In severe cases the large vessels, especially near their root, are sheathed with a zone of similar texture and consistency. Not infrequently the dorsal mediastinum becomes involved, and the fatty tissue and the lymph glands become firm owing to abundant infiltration of the tissue with leucocytes as well as to exudation of fibrin. These lesions, which seem to be characteristic of contagious pleuro-pneumonia, must be distinguished from certain interlobular changes which probably occur later, and are very much like those I have described as occurring in some cases of broncho-pneumonia. We may find cavities in the interlobular tissue wholly or partly filled with fibrinous or gelatinous translucent plugs, precisely as in broncho-pneumonia, and probably due to the same causes—emphysema and stagnation of the lymph current, and occasional infection with the pneumonia bacteria from the mouth and throat.

Another feature of the changes going on in the coats of the vessels first pointed out by Klebs in 1841, is the plugging of the veins, due to an inflammation of the inner coat. The disease process extends from around the vein through the walls of the latter to the inner coat. A deposit forms on the diseased spots within the vein, which partially or wholly occludes the vessel. It is a curious fact, first noticed by Klebs, that the thrombi occur only in the veins, although the connective tissue around the arteries is equally involved. The greater thickness of the arterial coat may, perhaps, have something to do with this fact. I have in vain sought for thrombi in the arteries accessible to ordinary dissection. These may, and usually are, filled with dark clots after death in acute cases, but they are easily distinguished from the firmly attached thrombi.

It is this thrombosis or plugging of the pulmonary veins which accounts for many of the changes which the parenchyma itself undergoes. We observe, for example, on making sections through different regions of an affected lobe at least three varieties of lesions:—(1) the very firm, granular, dark red, and yellowish hepatization; (2) the blackish hepatization or infarction; and (3) an œdema or filling up of the lung tissue with serum. The infarction is probably due wholly to the plugging of veins. In all cases examined I have found a definite relation between the size of the infarct, or blackish tissue, and the size of the occluded vein leading to it. The granular hepatization and the œdema are, perhaps, traceable in part to the interference with the venous circulation, in part to the plugging and effacement of the interlobular and perivascular lymphatics, and consequent rigidity of the framework of the lungs, in part to the specific activity of the unknown cause. The specific action of this agent upon the connective tissue, the occasional entire absence of hepatization, leads me to assume that the changes of the lung tissue proper, the hepatization, œdema, and hemorrhagic infarction are all secondary changes due to the disease of the veins and lymphatics which cause partial or complete occlusion of these channels. If this be borne in mind the variegated cut surface of pleuro-pneumonia lungs will be much better understood, and the differences between contagious pleuro-pneumonia and sporadic pneu-

monia, or even infectious pneumonia, due to other causes more easily ascertained, especially as thrombosis of pulmonary veins, has not been found, except as an accidental complication, in other lung diseases.

Another quite characteristic feature of contagious pleuro-pneumonia is the appearance of dead masses of lung tissue of variable size, which finally separate, and many become surrounded with a connective tissue capsule. These sequestra are recognizable as such if traces of the dead lung tissue can be found. If the mass is broken down into an amorphous fatty detritus, the absence of foreign bodies and of other lung affections will usually decide in favor of contagious pleuro-pneumonia as the original cause.

The characters of contagious pleuro-pneumonia as revealed by bacteriological and microscopical methods are, in the present stage of our information concerning the causation of this disease, of little use, excepting in the hands of the skilled pathologist, whose final decision as to the nature of any bovine lung disease will be made from all available characters, macroscopical as well as microscopical. There are, however, several features in the diseased pleuro-pneumonic lung which are readily detected after attention has been once called to them.

One of the most conspicuous features in a microscopic section from a lung affected with acute pleuro-pneumonia is the presence of intensely stained foci and lines. These lines, to which Prof. W. H. Welch called my attention some years ago, are visible to the naked eye, and when viewed with a hand lens suggest by their peculiar curves the contour lines on a map. They are situated at the margin of and within the inflamed connective tissue which surrounds the large vessels, and separates the lobules from one another. A closer examination of these lines indicates that they coincide with the boundaries of the lobules and of the individual lymph spaces of the interlobular tissue. Under a high power of the microscope they are resolved into dense masses of leucocytes in various stages of degeneration. These dense bands are presumably attracted to the connective tissue boundary of the lobules and to the walls of lymph spaces within the connective tissue by the unknown cause of the inflammation, presumably also the cause of the disease itself. The space between the lines is filled with fibrin, in which very few leucocytes are found.

It is these lines which enable the experienced observer to pick out from a number of slides those representing lungs affected with acute pleuro-pneumonia. The sporadic pneumonia associated with interlobular disease, which has been dealt with in the foregoing pages, also shows certain deeply stained lines occasionally within the interlobular tissue, but these are distinguishable in several ways. The band of leucocytes represents a closed wall within the interlobular tissue around a lymph plug, which has become the nucleus of an abscess. Outside of the leucocytic wall there is usually a zone of young connective tissue cells situated between it and the lobule proper. The leucocytic wall does not appear on the very edge of the lobule as in pleuro-pneumonia. In broncho-pneumonia there is furthermore an entire absence of cell infiltration around the larger bronchi and blood vessels, whereas in pleuro-pneumonia the cell masses are as dense and as abundant around these as in the spaces between the lobules themselves. In fact, it is the penetration of these cell masses into the inner coats of the veins which accompanies the thrombosis so characteristic of and peculiar to this lung affection. The masses of exudate which appear in the dorsal mediastinal space, and involve the fat deposits and the lymph glands embedded in them, present the same cell masses found in the connective tissue framework of the lungs themselves.

A peculiar phenomenon which may be mentioned here is the rapid and wholesale degeneration of the alveolar epithelium of that portion of the lung tissue which is involved in œdema, probably because it has lost its elasticity

by reason of the thickening and rigidity of the interlobular framework. In this tissue, infiltrated with serum, all, or nearly all, the epithelial cells from the alveoli are packed with roundish bodies, all of the same size in the same cell, but varying among different cells and in different lungs from 1.5 to 4 μ in diameter. They are visible only in fresh tissue as pale bluish gray, homogeneous bodies. Their striking uniformity, coupled with their abundance in the cell protoplasm, at first strongly suggested foreign parasitic organisms, but they were subsequently identified with the so-called Buhl's bodies, or myelin bodies, not uncommon in human sputum, where, however, they vary in size in the same cell, and entirely fail to give one the impression of parasitic organisms. These bodies appears as discs, presenting either the face or the edge. The latter appears either as two dark bands with a light band between them, or the reverse, according to the focus. This appearance would indicate that each body is a double disc. Sometimes they suggest, when on edge, an open clam shell. They failed to retain any color when aniline dyes with or without mordants were used. They equally refused to be colored by iodine with and without sulphuric acid. In fresh, teased preparations they remained for a time intact in a 10 per cent. solution of caustic potash. Later on they assumed to some degree the bizarre outlines of the myelin bodies of human sputum. There was apparently a peeling off of the external layers of the bodies, or a partial uncoiling. These bodies have no diagnostic significance, for cells containing them may be found in the lungs of healthy cattle, though in exceedingly small numbers. By treating the fresh, healthy lung tissue with caustic potash to dissolve the cell protoplasm they can be occasionally detected. Most probably they are the result of a certain disturbance of the nutrition of the affected tissues. In broncho-pneumonia they may be detected at times, but this kind of lung disease does not appear to produce them in any abundance.

The hepatization of the parenchyma in broncho-pneumonia is readily distinguished in microscopic sections, even with a hand lens, from that of pleuro-pneumonia by its focal arrangement. Each minute bronchus is plugged with cell masses, and around it is a zone of alveoli similarly occupied. In the hepatization of pleuro-pneumonia this focal arrangement is absent, and the alveoli are uniformly filled with fibrin or a variable mixture of fibrin and cells, depending on the stage of the disease.

In making a diagnosis between contagious pleuro-pneumonia and sporadic pneumonia, based on the lung lesions alone, it should always be borne in mind that the entire lungs should be subjected to examination. Attention should be given to signs indicating injury to the chest wall, to the possible presence of foreign bodies, and to severe inflammation of the air passages, which may result from the aspiration of irritant or corrosive fluids. Where those agents may be excluded special attention should be paid to the condition of the pleura and to the distribution of the disease, careful notes or sketches being made of the lobes involved. Next in order come the peculiar perivascular and interlobular thickening and the thrombosis of veins.* This leads to local necrosis of greater or less extent (infarcts), and finally to encapsuled sequestra if the animal should recover. The different features of the hepatized and œdematous portions of the lung tissue should be carefully noted. Lastly, the peculiar exudation and infiltration in the connective and fatty tissue of the dorsal mediastinum and of the embedded glands should not be overlooked. With the microscope, the peculiar dense cell masses of the diseased connective tissue should be looked for, and the nature of necrotic tissue de-

* Care should be taken not to confound mere clots with adhesive thrombi. In acute pleuro-pneumonia, after death, the arteries are usually distended with clots.

termined, in case microscopic appearances are no longer reliable, owing to hardening processes.

It should finally be borne in mind that the lesions of broncho-pneumonia and the interlobular changes which may follow it, may co-exist with contagious pleuro-pneumonia, and that both kinds of lesions may be encountered in the same lungs. Hence, great caution must be exercised in expressing an opinion when only a small portion of the lungs are presented for examination, because only that portion which is affected with broncho-pneumonia may have been submitted.

As regards the value of bacteriological examinations, it is safe to concede that if the pneumonia bacteria are generally disseminated throughout the diseased lung tissue, and more particularly in the interlobular tissue, the disease is not contagious pleuro-pneumonia, because in the latter the interlobular tissue becomes affected first, and is therefore closed to the entry of bacteria, while in broncho-pneumonia they are aspirated into the still normal interlobular tissue when new portions of the lung tissue become involved by reason of some great strain, producing interlobular emphysema. In general, the bacteriological outcome must be taken as one of the important factors in a diagnosis until the true cause of contagious pleuro-pneumonia shall have been definitely recognized.*

General Conclusions.

(1) Sporadic pneumonia of cattle usually appears as a broncho-pneumonia, to which may be superadded emphysema and interlobular disease, the latter simulating contagious pleuro-pneumonia.

(2) Broncho-pneumonia in cattle is a comparatively rare affection. It is probably in many caused by entry of fluids into the air-tubes during drenching. When secondary to tuberculosis, foreign bodies, etc., these causes are easily recognized at the autopsy.

(3) Of the nature of traumatic pneumonia, sometimes called transit pneumonia, due to blows upon the thorax and injuries received on board of ocean steamers, nothing definite is known.

(4) The bacteria of the swine-plague group found in the upper air-passages of healthy cattle are present, usually in pure cultures in broncho-pneumonia, and are, to all appearances, responsible for the interlobular disease and for the persistence and extension of the lung disease.

(5) In lungs affected with contagious pleuro-pneumonia most of the cultures made from the parenchyma and the interlobular fluids and exudates remain sterile. In some cases, however, as might be anticipated, the bacteria of the swine-plague group are present.

(6) The bacteria found in bovine pneumonia are more frequently provided with a capsule than those found in swine. Other differences are not constant.

(7) Outbreaks of septicæmia and infectious pneumonia in calves are probably in most cases due to highly virulent races of the same group of bacteria.

CAMPHOR AS AN ANTIGALACTOGOGUE.—Herrgott (*Rev. Méd. de l'Est*, February 1st, 1897) being dissatisfied with the effect produced by the usual antigalactogogues, including antipyrin, has tried camphor, and finds that 9½ grains a day, divided into three doses, and given for three days, nearly always produce a remarkable diminution of the secretion. He has used it in 30 cases, having been first led to try it by the good results obtained by Kiener in animals, especially milch cows.

* Arloing claims to have discovered the cause of contagious pleuro-pneumonia in a bacillus (*B. liquefaciens bovis*). As this discovery seems to be discredited in his own country by Nocard, we must await confirmatory investigations, especially as the statements appear improbable.

A LAND FLOWING WITH MILK AND BUTTER.

UNDER the above heading the *North British Agriculturist* is presently giving a series of articles on Danish farming, by the Editor, who has recently made a tour of inspection in that country with the view of examining into some startling statements which had been made by the Royal Commission on Tuberculosis, regarding the prevalence of tuberculosis in Denmark, and the sanitary condition of the dairies in that country. From the second article of this series we give the following extract:—

As we left the town behind, and got out into the country, the first thing that struck us was the total absence of dykes, fences, or hedges between the different fields. We afterwards learned that in Denmark it was the all but universal custom of the country to have all kinds of farm stock, whether horses, cattle, or sheep, tethered to stakes when grazing in the fields. On this occasion, however, we saw very few stock grazing in that way, for the dairy stocks on the farms near Copenhagen are mostly all kept on the "soiling" system, that is to say, they are kept and fed in the house summer and winter. Another thing that struck us was the rather weedy condition of the land, particularly the grass land. The land itself was naturally a good loam in good manurial condition, but the grass was badly infested with dandelions, docks, thistles, ox-eyed daisies, and other weeds, while among the barley and oat crops tussilago was also a good deal in evidence. The rye crop was well forward, and some portion of it had been already cut for feeding the cows. The land that was being prepared for the root crops was only indifferently cleaned and cultivated, while the furrows and drills were "as crooked as the Canongate," to use Professor Wilson's expressive phrase. In fact, if any farmer around Edinburgh had his land as indifferently cleaned and cultivated as that around Copenhagen, he would be in no danger of being regarded as a model farmer.

In the course of our drive we called at five of the farms, and were received by the owners with characteristic Danish politeness. Denmark, it may be here noted, is mainly a country of occupying owners; but, according to the custom of the country, the occupying owners of the smaller farms up to 100 acres or so are called peasants, while the occupying owners of the larger farms are called proprietors. In the immediate vicinity of Copenhagen the farms are comparatively small, many of them ranging from 50 to 120 acres. We found the farm buildings, including the owner's house, were generally in the form of a square, the house usually overlooking the courtyard. The house was invariably a very unpretentious structure, such as a tenant-farmer holding the same acreage of arable land in Scotland would decidedly demur to occupy. The walls of the farm buildings were of brick—for building stone is a rare commodity in Denmark—and the roofs were mostly thatched with river reeds or straw. In not a few cases the outside of the walls had been whitewashed, so that, when seen from the road in passing, the homestead looked not so bad, though very old-fashioned. A closer examination, however, soon showed that the conditions under which the dairy stock were kept left much to be desired. The ceilings of the byres were very low, as it is the general plan to have the hay stored in the loft overhead, and let down as required through openings in the floor. The cows were mostly stalled in double rows—the stalls, graip, and passages being all of rough "cobble-stones." As the object of each farmer in the vicinity of Copenhagen is to keep

as heavy a stock of cows as his farm will carry with the aid of purchased feeding stuffs, the straw is mostly all used for forage, so that the cows have to lie on the rough stones, which have always more or less earthy refuse or other matter on them, so that, unless extreme care be taken to wash or brush the udders of the cows before milking, the milk will inevitably be contaminated with a lot of dirty matter. The provision made for ventilating the byres by means of small windows in the walls was certainly not such as would come up to our modern ideas of sanitation. It had evidently been a long time since the walls inside the byres had been whitewashed, and the excrementitious matter fermenting in the hollows between the cobble-stones of the passages gave them an unpleasant odour. But the gravest objection that could be taken to these byres was the fact that in mostly every case the pump for the water supply was within a very few yards either of the byre or the dungstead, or both. Alike, therefore, in regard to construction, cubic air space, ventilation, lighting, condition as to cleanliness, and source of water supply, these dairies, had they been in this country, would have been very speedily dealt with by the sanitary inspector.

The cows which we saw in the byres were a mixed lot, some being of a red horned native breed of Zealand, while others had been imported from Sweden, and of these Swedish cows a good many were evidently dashed with Ayrshire blood. They were all good milkers, however, for every owner weighs the milk of each of his cows at least once a fortnight, and a cow that did not give a good weight of milk would soon be sent to the butcher. In conversation with the owners, we learned that few, if any, dairy stock were bred there, as selling milk in Copenhagen at 7d. to 8d. per gallon retail price paid much better than rearing calves. In that district, therefore, the cows were brought in either newly calved or "at the drop," and fed at the hardest in the byres on the "soiling" system as long as they gave a good flow of milk, but as soon as their yield of milk ceased to give a profitable return for their feeding, they were sent to the butcher. Clover-grass—supplemented with green rye in the early part of the summer—and brewers' grains form the staple food of the cows in the summer, and in winter the cows get a mixed ration of mangolds, ground grain, maize-meal, and linseed or cotton cake, together with hay or straw, and brewers' grains as a matter of course. Large quantities of dairy and stable manure from Copenhagen are used for keeping up the fertility of the farms, the price of these fertilisers being about 1s. per ton, which, by the way, is just the price at which stable manure is now sold in Edinburgh. There were thus several points of resemblance between the dairy farming in the immediate vicinity of the Danish capital and that seen in the vicinity of the Scottish capital, but there was one point of difference between the two, namely, that the sanitary conditions under which the milk is produced on these Danish farms is a long way below the standard imperatively insisted on by the sanitary inspectors in this country.

There is one point, however, on which it may be open to doubt whether the dairykeepers around Copenhagen are not acting out a wiser policy than these in and around Edinburgh. The farmers around Edinburgh, who either keep cows themselves or grow crops to feed the 22,000 head of cows kept in Edinburgh and Leith, aim at growing heavy crops of Italian rye-grass, of which they get three or four cuttings in a season, each successive cutting being followed up by the land getting a dressing of 3 cwt. of nitrate of soda. In such a case, on account of the rapidity of the growth, the nitrogenous part of this dairy food supply must be of a very crude order, and very little of it can be in the albuminoid form, so that the grass so produced acts mainly as so much "padding" to the feeding cakes, meals, and brewers' or distillers' grains supplied to the cows. On the other hand, the Danish dairy farmers aim at producing heavy crops of clover, which is very nutritious of itself, and requires

no artificial nitrogenous manure to stimulate its growth, as, being a luguminous plant, it obtains abundant supplies of nitrogen from the atmosphere, and stores up a large stock of nitrogenous matter in the soil for the use of the succeeding crops. The clover crops which we saw in the vicinity of Copenhagen were certainly very good, but their appearance was sadly spoiled by the mass of dandelions, docks, thistles, and other weeds growing amongst them.

In the course of our drive, we also had full proof of the fact that the Danish farmer has a great handicap over the Scottish agriculturist in regard to the price of labour. In Denmark the price of farm labour is very cheap, and it is probably cheaper in the vicinity of Copenhagen than it is in any other part of the country, as bands of destitute Swedes are constantly landing there in quest of employment. On the farms near the Danish capital we found that a considerable proportion of the ploughmen were Swedes, and the wages ranged from 220 to 260 kroner per annum, with board. The kroner is equal to 1s. 1½d., so that these wages in British money would be from £12 to £15 per annum. The hours of labour are also very long. There is no Campbell, of Barry, there to agitate for shorter hours and Saturday half-holidays. In Denmark the farm labourers commence work at or before 4.30 a.m., and, barring the two hours interval at mid-day, they go on till 7.30 p.m., or even later. The wages, therefore of the farm labourers in Denmark are at least one-half lower than they are in Scotland, while the hours of labour are very much longer there; but it may be fairly doubted whether the Danish farmer gets more work out of his men in those thirteen hour days than he would get in a ten or even a nine-and-a-half hours' day.

But the longest day draws to a close. The sun sinks on the western horizon, and "the ploughman homeward plods his weary way"—that line in the poet's "Elegy" applies much more forcibly to Denmark than to Scotland. As for us, we have to meet Professor Bang at the Landbohoiskole School at 9 p.m., to go with him to inspect the premises and operations of the far-famed Copenhagen Milk Supply Company. We must, therefore, hasten back to the city, and, as we do so, we breathe the fervent hope that the milk for this colossal Supply Company has been produced under very different sanitary conditions from those which obtained at the farms we had seen that afternoon. But the account of our visit to this Company's premises must be held over till next week.

Army Veterinary Department.

THE Annual Dinner of the Army Veterinary Department was held at the Hôtel Métropole on the 1st instant, when the following officers were present:—

Veterinary-Colonel J. D. Lambert, C.B., Director-General; Veterinary-Lieut.-Colonels J. H. B. Hallen, C.I.E., W. B. Walters, C.B., J. Kettle, J. C. Berne, J. Reilly; Veterinary-Majors G. Durrant, R. Rowe, I. Matthews, J. K. Grainger, J. J. Phillips, S. Duff-Gillespie, T. Flintoff, J. D. Edwards, W. A. Crow, F. Smith, D. C. Pallin, J. A. Nunn, C.I.E., D.S.O.; Veterinary-Captains A. A. Jones, R. Pringle, R. Moore, J. T. Dibbin, G. H. Fenton, F. J. Short, J. Cooper, C. E. Nuthall, E. R. C. Butler, J. A. Meredith, A. J. Haslam, D. J. Barry, G. R. Griffith, D.S.O., Principal Veterinary Officer, Egyptian Army. Veterinary-Lieutenants F. B.

Drage, J. H. Jackson, J. Moore, F. C. Stratton, H. T. Sawyer, A. Smith, H. M. Lenox-Conyngham, W. A. Pallin, E. E. Martin, P. J. Harris, and Veterinary-Captain W. Scott, Principal Veterinary Officer, New South Wales.

Extract from *London Gazette*, of June 1st, 1897:—Honourable Artillery Company of London, F. S. Stanley, gentleman, to be veterinary-lieutenant, dated June 2nd, 1897.

Editorial.

THE JUBILEE CELEBRATION.

THE celebration of the close of the sixtieth year of Her Majesty's reign has come and gone since last I addressed my readers, and it has brought its gratifications and its disappointments, its realised hopes and ambitions, its shattered idols, its intensified bitterness, as every great national celebration must bring. The hard-working veterinary surgeon, whether in town or country practice, has probably shared in very little of the national or local festivities; such seasons are wont to bring him only an increase of work and anxiety, and if he grumbles at his hard lot as he compares it with that of the careless holiday-maker or of the man of wealth and leisure, surely we cannot blame him, but must rather extend to him our brotherly sympathy. It may be true that on every great occasion, as at every great crisis in a nation's history, someone must be offered as a sacrifice to the gods, yet we all like to throw the responsibility on someone else, and avoid the unpleasant distinction. I believe there is no more loyal body than the veterinary surgeons of the country, and I feel that I voice the inmost and sincerest wishes of my professional colleagues when I express the hope that our most gracious Sovereign Lady may pass the remainder of her life in happiness and tranquillity—secure in the loyalty and fidelity of her veterinary subjects as of her people at large.

It may be interesting at such a time to recall a few facts to those of my readers who are seniors like myself, and to remind the juniors who are the hope of the country that they are heirs to a goodly inheritance. I have had occasion more than once to speak of the merits of my predecessor in the editorship of the VETERINARY JOURNAL, Dr. George Fleming, and I would here refer my readers to these articles and tell them that Dr. Fleming's biography, when it comes to be written—and I hope it will be an autobiography by my

genial colleague, and that he will let us have it soon—will be in a way a history of our profession. We have had a rough and severe training, we have undergone harsh discipline, we have received more frowns than favours, but we have grown up strong and hardy in spite of it all, and we mean to assert our rights and secure an honourable position. Her Majesty has not been lavish with her honours to our profession. It is true, Dr. Fleming is a C.B., as are also one or two army men and Government veterinary officials, but the rest of us are, like horses in a race—nowhere, so far as courtly favour is concerned. Still, we are children of the Victorian era, and we are in a manner celebrating our Jubilee. Until 53 years ago—that is, after the Queen had been seven years on the throne—there was no distinctive degree assigned to veterinary surgeons, and, consequently, there was no protection for us; any man could write V.S. (as women *still* can do) after his name, and go about the country murdering horses and cattle. The consequences were, of course, disastrous; disease raged furiously in the national flocks and herds, and great losses were caused until the crowning calamity of rinderpest in 1866, which threatened stock-owners with the total extinction of their herds of cattle. In those days practitioners had abundant opportunity of studying pleuro-pneumonia, glanders, farcy, foot-and-mouth disease, scab and other horrors; now my students learn about these things as about an unholy tradition, or they read of them in foreign journals, but their opportunities of studying them as terrible realities in this country are very rare indeed. And what does this mean but a vast increase of the national wealth, thanks to the exertions of veterinary surgeons, who find little recognition either at court or university.

One other point I must accentuate, being not only a practitioner but a teacher and one of forty years' standing. It is this: whilst all other departments of education have been made matters of national concern, veterinary teaching has been left to take care of itself, Veterinary schools receive not one penny of national money; no Government grants are accorded to them; they are left to sink or swim as they like or can. Now whilst, like the old Roman, I wrap myself round with the cloak of sturdy independence, and can confidently point to the work accomplished, not only by myself but by my colleagues who are teachers, whilst I refuse to cringe to any Government or beg anyone for protection or help, still I think our educational authorities are at fault in not taking more interest in veterinary medical affairs. I

have spoken of the increase of the national wealth brought about by the efforts of veterinarians to stem disease and restrict its ravages, but I doubt very much if the careless public realises or even thinks of its obligations to us. The production of grain crops and especially of wheat, the most important of all, seems to be almost hopeless in this country. Other countries with their vast tracts of fertile land and their sparser population seem destined to supply us with what is necessary in the way of cereals, and consequently our farmers and landowners must turn more and more of their attention to the breeding of horses and cattle. It is deplorable to hear of great breadths of land in England going out of cultivation, and that within a moderate distance of the largest city in the world; it is vexatious to learn that our farmers, whilst lamenting their hard lot, allow so much of the trade in butter, cheese, and bacon to fall into the hands of their French and Danish competitors. Our breeds of horses, cattle, and swine are practically the best in the world; all that is wanting is systematic and, let me add, scientific treatment of the whole thing. Let us consider how much Bang has done for the cattle and dairy produce trade of Denmark, how much Nocard has done for France, Dieckerhoff and his colleagues for Germany, Buonsanti and Vachetta for Italy, with the assistance of their various Governments, and we shall cease to trust to haphazard working. It is all very well to talk of England as the workshop of the world. That may be part of her destiny; assuredly it is not the whole.

VETERINARY SURGEONS IN VOLUNTEER CORPS.

A MATTER which has not received much attention from the professional press, nor from the members of the veterinary profession generally, and yet is of great importance, is the position of veterinary surgeons in Yeomanry and Artillery Volunteer and Mounted Rifle Forces. Many veterinary surgeons belong to one or other of these forces, and are either troopers, corporals, or sergeants. All honour to their patriotic spirit—but other veterinary surgeons are farriers, or farrier-corporals, or farrier-majors, and wear the distinctive badge of army farrier. This is not form for men who have had a professional training. The profession has struggled hard enough for years to gain a recognisable distinction between its members and farriers or shoeing-smiths, and to a certain extent we have succeeded, but this stumbling block

still remains, and should be removed. The harm done is not sufficiently appreciated—but if we give a few instances perhaps those at fault will see the error of their ways and endeavour to correct them.

Our first instance is one which we consider correct form for a veterinary surgeon, and the others show what to avoid :—

A. obtains his commission, dines at mess, pays his share of mess-bill and other sundries, and makes no charge for attending cases whilst serving Her Majesty.

B. (bad) obtains his commission, does not dine at or join mess, accepts gratuitous lunches or dinners, and charges for medicines and attendance.

C. (worse) obtains his commission, and doesn't assert any of his rights, doesn't join the mess, and isn't even saluted by the non-commissioned officers and troopers.

D. (worst) accepts the appointment of farrier of some rank, and is looked upon as an ordinary tradesman, and not as a soldier.

We are of opinion that if a civil veterinary surgeon is filled with military ardour he should go as an ordinary trooper, and by steady attention work his way up, and, perhaps, ultimately obtain a commission as a combatant officer, or else he should obtain his commission as veterinary officer, and devote his time, skill, and money to the regiment for the honour and glory of his country ; or else he should have nothing at all to do with soldiering.

We have received a copy of Professor O. C. Bradley's "Manual of Anatomy." It is not possible for us to criticise it as we would other works, as he is our own colleague and one for whom we have the greatest regard, and show our appreciation in our way, and that is by trusting he will long remain a colleague. We thoroughly concur with his method of teaching, and, in wishing him success as an author, we have great pleasure in congratulating him as a most able teacher.

At the special meeting of the Royal College of Veterinary Surgeons, held in 10, Red Lion Square, London, Professor Penberthy, of the Royal Veterinary College, Camden Town, was unanimously elected President for the ensuing year. Messrs. Mason, McFadyean, Trigger, Simpson, Wragg, and

Sir Henry Fitzwygram, Bart., were elected Vice-Presidents. Mr. S. Wragg was re-elected Treasurer, and Mr. A. W. Hill Secretary.

Proceedings of the Royal College of Veterinary Surgeons and Veterinary Medical Societies, etc.

ROYAL COLLEGE OF VETERINARY SURGEONS.

The Annual Meeting.

THE Annual General Meeting was held on Wednesday, June 22nd, the President, Mr. R. C. Trigger, being in the chair. The following gentlemen were present:—Messrs. H. J. Simpson, Wartnaby, J. F. Simpson, Malcolm, Rutherford, Ward, Harris, Jacobs, Mason, Savournin, Bower, MacCormack, Mayall, McFadyean, Penberthy, Block, Blakeway, Shipley, Jr., Wragg, F. B. Lowe, J. A. W. Dollar, T. A. Dollar, Stevens, Walters, Nunn, Villar, Barrett, G. C. Lowe, Woodger, Dawson, Hobday, Wilson, Hooper, Olver, Pritchard, Lambert, W. W. Dollar, Hunting, Reekie; Gen. Sir F. FitzWygram, Bart.; and Vet.-Major Phillips.

In opening the meeting the PRESIDENT said he had great pleasure in welcoming the members to the Fifty-fourth Annual Meeting and in asking their criticism on the report. Fortunately, it was not his province to do the speaking, but there were just one or two matters he would like to anticipate. He wanted first of all to call attention to the unfortunate mistake in the directions on the voting paper, but he could assure the members that no one regretted the mistake which had occurred, entirely through inadvertence, more than the secretary. So far as could be judged, the chief consequence of the mistake was that it had entailed a large amount of labour upon the scrutineers; it had in no way affected the results of the election. Every absolutely good vote was counted, with the result that the election came out with every candidate in a certain position, and then the scrutineers took the separate votes of those who had voted again, but in no case did the amended votes alter the position of any candidate on the poll. The absolutely bad votes were separately tested, and the scrutineers were kind enough to see what the result would have been had those votes been valid, and the result was again that in no cases was the position of any candidate altered. There was one other matter on the report which was not complete, and from the nature of things could not be complete at the time the report was drawn up, and that was with regard to the Scotch Bill. The report simply stated that a committee had been appointed to wait upon the Lord Advocate. He (the President) was very pleased to inform the members that the result had been that Clause 40 had been amended as was wished, and Clause 57 confirmed in every way to their advantage. It still had to go to the House of Commons, but he believed that was a mere matter of form, and it might be taken as practically settled. In fact, he was assured by the solicitor that it would be a very unusual thing to find any alteration made now. It was a very gratifying result, and nobody, except the solicitor and himself, could know the trouble incurred and the correspondence which had taken place with reference to the matter.

On the motion of Mr. J. F. SIMPSON, seconded by Mr. WARTNABY, the minutes of the last annual meeting were taken as read, and confirmed.

Scrutineers' Report.

The Scrutineers declared the result of the poll to be as follows:—

Carter	814	Mulvey	710
Cope	552	Nunn	464
Edgar	633	Pallin	486
Irving	174	Reekie	98
Kettle	273	Sewell	449
Kidd	452	Williams, W.	747
Leeney	117	Williams, W. O.	606
McCall	825	Wragg	898

The PRESIDENT declared the following gentlemen to be elected: Messrs. Wragg, McCall, Carter, W. Williams, Mulvey, Edgar, W. O. Williams, and Cope.

Annual Report.

The annual report, on the motion of Professor PENBERTHY, seconded by Mr. MASON, was taken as read; and on the motion of the PRESIDENT, seconded by Colonel WALTERS, it was adopted unanimously, without any discussion.

Vote of Thanks to Scrutineers.

Mr. MASON moved a vote of thanks to the Scrutineers. After the painstaking and cheerful manner the Scrutineers had performed their duty it was only right that the members should heartily thank them.

Mr. J. F. SIMPSON seconded the motion. He said he had had an opportunity of observing the Scrutineers' work, and it was undoubtedly carried out admirably by them.

The resolution was carried unanimously.

Vote of Thanks to President.

Professor PENBERTHY said he was sure that after the most agreeable, almost unique meeting of the Royal College of Veterinary Surgeons, the members would support him in offering a hearty vote of thanks to the President and Chairman. He had great pleasure in proposing that the thanks of the members be given to the President for the manner in which he had conducted the business of the meeting, and, so far as it had gone, the affairs of the College during the present year.

Mr. DOLLAR seconded the motion, which Veterinary-Major J. J. PHILLIPS, A.V.D., supported, and it was carried with acclamation.

The PRESIDENT, in replying, thanked the members heartily. He thought the kind manner in which they had adopted the report showed their perfect approval of the action of the Council during the past year. There was no doubt that very many and important changes had taken place—or at least if they had not been inaugurated, had come into operation in the past year—and he ventured to think that now the Council were becoming masters of the large amount of work, which at first was rather new and complicated to them, there was a very great future before the members of the College. The members had very kindly made allowance for many defections on the part of the Council.

THE MAY EXAMINATIONS IN SCOTLAND.

The Written Examination was held in Edinburgh and in Glasgow on the 14th, and the Orals and Practical on and between the 18th and 25th of May.

The following gentlemen passed their Final Examination, and (with the

exception of Messrs. H. Brittain and J. Rankine, who are under the required age) were admitted members of the Royal College of Veterinary Surgeons :—

Dick College.

Mr. J. Brownless.*
„ W. Cathcart.
† „ H. Lomas.
„ W. Murgatroyd.
‖„ J. F. Talbot.
„ J. G. Blackwood.
„ B. S. Cockerton.
„ S. S. Forster.
Mr. J. Grant.
„ J. H. Norris.
„ W. B. Stableforth.
„ R. C. Smith.
„ T. Wilkinson.
„ A. Scott.
„ J. R. Wardrope.

New College.

Mr. W. H. Savage.
„ H. Briggs.
„ H. Brittain.
„ J. Pollard.
„ G. C. Barber.
Mr. J. H. Lomas.
„ R. S. Rowlands.
„ A. A. Wilson.
„ E. Segar.
„ A. Munro.

Glasgow College.

Mr. J. F. McEachran*
„ J. R. McCall.
„ G. N. Waugh.
„ G. Broom.
Mr. F. Russell.
„ J. Rankine.
„ J. Laird.
„ D. McGeoch.

London College.

Mr. M. Allan.

The following passed their Third Examination :—

Dick College.

Mr. J. H. Brown.
„ A. C. Burton.
„ A. Gibson.
„ T. Loughran.
„ C. A. Reid.
„ H. Ryan.
Mr. W. Tart.
„ T. H. Tranter.
„ S. A. Winkup.
„ E. Lander.
„ H. Leyshon.

New College.

Mr. E. Morrison.
Mr. G. J. Roberts.

Glasgow College.

Mr. R. H. Johnson.
„ J. C. Erskine.
„ D. Weir.
„ J. W. Conchie.
Mr. H. O. Oliver.
„ J. Smith.
„ R. G. Jones.

London College.

Mr. E. T. C. Ensor.
Mr. T. W. Oakley.

Marked thus * passed with second honours.
„ „ † „ first „

The following passed their Second Examination :—

Dick College.

Mr. R. Garret.
,, R. Bryden.
,, A. E. A. Charles.
† ,, F. W. Coates.
,, J. Cowan.
,, W. P. Cushnahan.
,, D. G. W. Galt.
* ,, J. J. Garside.
* ,, R. Garraway.
† ,, W. Girvan.
† ,, A. Gofton.
,, T. Hogg.
,, C. P. Hynes.
Mr. J. F. Joyce.
† ,, H. W. Leech.
* ,, G. H. Livesey.
† ,, E. Little.
* ,, W. Ludgate.
,, E. Mossman.
,, J. A. McGregor.
* ,, J. McIlvenna.
,, J. J. O'Connor.
,, E. O'Neil.
* ,, A. Robb.
,, J. A. Russell.
† ,, W. S. King.

New College.

Mr. G. E. Hamilton.
,, T. C. Howatson.
,, J. Bradley.
† ,, H. Dyson.
* ,, J. Evans.
* ,, W. Gasgoyne.
Mr. A. McNae.*
* ,, D. M'Donald.
,, R. A. Plunkett.
† ,, H. Taylor.
,, C. R. Levist.
,, R. Butler.

Glasgow College.

Mr. E. Soutter
* ,, W. Watson
,, D. M'Hattie
Mr. J. Montgomery
,, J. Aitken
,, F. Timing

The following passed their First Examination :—

Dick College.

Mr. W. J. Boyd
,, J. Cockroft
,, F. H. W. Cundell
,, C. A. W. Cunningham
,, R. A. Edwards
,, J. Forrest
,, G. Garden
Mr. T. Harper
,, W. Hepburn
,, J. Hobday
† ,, R. B. Littler
,, T. Nunan
,, E. A. Ryan
,, S. E. Sampson

New College.

Mr. E. Ashworth
,, S. C. Binks
,, W. G. Brindred
,, F. Crossley
,, J. P. Dunphy
,, H. Martin
Mr. B. Runciman†
,, T. Runciman
,, A. Spruell
,, J. Stafford
,, A. A. Walker
,, W. H. Bradley

Glasgow College.

Mr. F. P. Beck
,, T. Price
Mr. W. G. Forbes
,, J. Allan

London College.

* Kumar Shri Jettrye.

R. RUTHERFORD, F.R.C.V.S.,
Secretary to Board of Examiners.

Marked thus * passed with second honours.
,, ,, † ,, first ,,

2nd July, 1897.

Agenda for Meeting of Council.

To elect a President, six Vice-Presidents, Treasurer, Secretary, and Registrar.

Agenda for Quarterly Meeting.

Minutes.

Correspondence.

To receive Reports of the Finance, Registration, and Examination Committees.

To receive the Report of the Fellowship Examination.

To receive the Reports from the Court of Examiners.

To appoint Committees for the year.

To appoint a Committee *in re* the Steel Memorial.

To receive the Report of the Parliamentary Committee *in re* Public Health (Scotland) Bill.

The following have given notice of their intention to move:—

1. By Mr. TRIGGER:—

To ask the Council to vote their thanks to those Members of Parliament who had kindly assisted in the passing of the Public Health (Scotland) Bill.

2. By Mr. DOLLAR:—

That the thanks of the Royal College of Veterinary Surgeons be suitably conveyed to J. W. Crombie, Esq., M.P., The Hon. Alan de Tatton Egerton, M.P., Captain Jessel, M.P., and such other persons as may have assisted us during the passage of the Public Health (Scotland) Bill through Committee, for the kind interest they have shown and support they have afforded.

Obituary.

And for other business.

At the termination of the above meeting Agenda a SPECIAL MEETING will be held to consider, and, if necessary, to pass the following Notices of Motion:—

1. By Mr. MULVEY (Alteration of Bye-law 67), to leave out the words—

"His first, second, or third," and substitute "any professional."

2. By Mr. DOLLAR:—

That in case of each and every person summoned by the Registration Committee of the Royal College of Veterinary Surgeons to defend a charge of "conduct disgraceful to him in a professional respect" who shall enter a defence, a full report of the charge and of the defence, whether delivered in writing or by word of mouth, shall be kept by the Secretary of the Royal College of Veterinary Surgeons, and that in the event of the Council of the Royal College of Veterinary Surgeons directing the name of the said person to be removed from the Register, such report shall be published in the professional journals not more than three nor less than two months after the date of such direction, except in the event of the said person waiving his right to appeal to the Privy Council, when the report shall be published on receipt of notice from him to that effect.

Or alternatively—

That on receipt of notice from the person charged with "conduct disgraceful to him in a professional respect," ten clear days prior to the date fixed for his appearing before the Registration Committee, to the effect that he desires to be heard in open court, the President or Chairman of the Registration Committee shall fix an hour for such hearing, and shall transmit to the professional journals notice thereof, whereupon any members of the profession, to a number not exceeding twenty, shall, on personal application at the time named, be admitted to hear the trial of such charge

3. By Mr. DOLLAR:—

That no member of the Registration Committee or of the Council, who shall have made complaint to the said Committee or Council, of a Member or Fellow of the Royal College of Veterinary Surgeons having been guilty of conduct disgraceful to him in a professional respect, shall vote on the motion to remove from the Register the name of such Member or Fellow or to inflict other penalty.

DR. FRANCIS W. WRAGG, ESQ., TREASURER, *in Account with the Royal College of Veterinary Surgeons.* CR.

RECEIPTS.

1897.		£	s.	d.	£	s.	d.
April	To Balance				26	8	2
,, 6.	,, Dividends on Consols, £7610 13 1 at 2¾ per cent.				50	11	6
,, 24.	,, 8 Fellowship Entrance Fees at £5 5				42	0	0
,, ,,	,, 1 Student's Registration Fee, London, at £1 1				1	1	0
,, ,,	,, 1 Student's Registration Fee, Scotland, at £1 1				1	1	0
May 17.	,, 1 Fellowship Entrance Fee at £5 5				5	5	0
,, ,,	,, 8 ,, Fees, at £10 10 ...				84	0	0
June 1.	,, 124 Students' Fees, Scotland, at £5	620	0	0			
,, ,,	,, 31 ,, ,, ,, at £4 4	130	4	0			
,, ,,	,, 76 ,, ,, ,, at £3 3	239	8	0			
,, ,,	,, 32 Students' Registration Fees, Scotland, at £1 1	33	12	0			
,, ,,	,, 1 Student's Registration Fee, due Christmas, at £1 1	1	1	0			
					1024	5	0
,, ,,	,, 1 Restoration of Name to Register, at £1 1				1	1	0
,, ,,	,, 1 Student's Fee, London, for July Examination, at £3 3s. ...				3	3	0
					£1238	15	8
	To Balance brought down				£1142	15	1
					£1142	15	1

LONDON, *June*, 1897.

EXPENDITURE.

1897.		£	s.	d.
April	By Rates and Taxes—Poor Rates	15	8	4
,, 29.	,, Bank Commission on Drafts	0	1	6
May 18.	,, Petty Cash	20	0	0
,, 19.	,, Bank Commission on Draft	0	1	0
June 3.	,, ,, ,, ,, Scottish Cheque ...	0	9	9
,, ,,	,, *Re* Custance—Arrest. Order on Mr. Rutherford	60	0	0
,, ,,	,, Balance at Bankers	1142	15	1
		£1238	15	8

LIABILITIES.

June	By Examiners' Fees, Scotland £391	3	0				
,, ,,	,, Travelling Expenses	114	19	3			
,, ,,	,, Examination Expenses ...	80	10	2			
,, ,,	,, Half-year's Salary to Sec., Bd. of Exams., Scotland	31	10	0			
					618	2	5
,, ,,	,, 3 Fellowship Examiners' Fees at £9 9	28	7	0			
,, ,,	,, ,, Trav. Ex.	3	15	0			
					32	2	0
,, ,,	,, Salaries and Wages ...				97	15	0
,, ,,	,, Rates and Taxes—Gas £2 0 10, Poor Rate £15, Water Rate £4 16... ...				21	16	10
,, ,,	,, Instruments—Messrs. Arnold and Son				2	8	0
,, ,,	,, Law Expenses				80	0	11
,, ,,	,, Repairs & Hire of Chairs, Meeting, etc.				8	17	0
,, ,,	,, Printing—Messrs. Adlard £39 17 3, Messrs. Harrison £3 17 6				31	6	9
,, ,,	,, Stationery—Messrs. Adlard £39 17 3, Messrs. Parkins and Gotto £2 10, Messrs. Waterlow £2 2				44	9	3
,, ,,	,, Household Expenses				3	8	10
,, ,,	,, Coals				3	9	0
,, ,,	,, Shorthand Writers				13	7	2
,, ,,	,, Accountant's Fee...				5	5	0
							962 8 2
,, ,,	,, Balance						180 6 11
							£1142 15 1

SCOTTISH METROPOLITAN VETERINARY MEDICAL SOCIETY.

THE summer meeting of the Scottish Metropolitan Veterinary Medical Society was held at Aberdeen.

Dinner to Members.

Prior to the meeting of the Society, the North of Scotland Veterinary Medical Society entertained the members at dinner, in the Bon-Accord Hotel. Principal Williams, New College, Edinburgh, presided, and there was a good attendance. After an excellent repast, served in Mr. Mollison's usual excellent style,

The CHAIRMAN proposed the usual loyal toasts, referring to the Queen's record reign, and to the progress that has been made by the country under her wise and beneficent rule.

Mr. SKINNER, Oldmeldrum, then, in felicitous terms, proposed "The Scottish Metropolitan Veterinary Medical Society." It was very fortunate, he said, that the youngest veterinary society in Scotland should have the honour of entertaining the eldest one, and especially that they should have such a man as Principal Williams in the chair.

Mr. BOYD, Melrose, the president of the Scottish Metropolitan Society, returned thanks, and, in doing so, referred to the progress that has been made in veterinary science, and to the benefits which resulted from the meetings of such societies.

Professor HUNTER, Edinburgh, in proposing the toast of "The University of Aberdeen," said the university was not only in Scotland a favourite seat of learning, but it was looked up to very much all over England. It had been a very fortunate university in theology, medicine, and law—in fact, in the south they were a little jealous of it. A large number of the best Government appointments had fallen to men from the University of Aberdeen. All this went to show that the teaching in the Northern University was really very good. Probably in one way the excellence of its students was due to other causes than the excellence of its teachers, with all due respect to them. One of its many advantages was that there was a closer connection between teacher and student than could possibly be the case in some of the large universities in the south, and in this way it compared favourably with some of the universities in Germany and Italy, where the professor and his students were chums, with the result that it became an honour as well as his interest for a student to follow closely the example of the teaching of his professor. The excellence of the Aberdeen student was also due perhaps to the strong-headed, clear-thinking properties of men in the north.

Mr. WILSON, lecturer in agriculture, in acknowledging the toast, said the university would be celebrating its fourth centenary in a few years, and like human beings who became old, it had some faults. He had taken note of two. One, which could be remedied, was that it was at present passing under a cloud of hard-up-ness; but they were hoping that somebody—a M'Ewan or an Usher—would start up in Aberdeen or on Speyside—the King of Minmore or some of those granite kings, like that of Kemnay, or some of those kings of the North Sea, such as their friend Baillie Pyper or the Lord Provost—and put the University of Aberdeen on a sound basis. The other fault was that it looked back on the days of its youth as its best days. The old traditions of education still stuck to the universities of Scotland. The ancient studies were still looked upon by the universities as the only studies fitted to make men educated men; and this was an unfortunate thing for the university and for the country. To take, for instance, such studies as Latin and Greek, these greatly handicapped the other studies in the universities, which was very detrimental to the country and the universities. It was held that these studies introduced a man to the knowledge of the ancients. But what was the know-

ledge of the ancients compared with the present-day knowledge which could be obtained from German or French publications? They hoped that by-and-by, when the present Commission had expired, these things might be altered. He went on to refer to the advance made by Aberdeen University in the formation of its agricultural department, remarking that, in this respect, it was, perhaps, ahead of some of the older universities, and that it had been the first university to appoint a regular veterinarian.

Mr. JAMES THOMSON, Aberdeen, gave "The Lord Provost, Magistrates, and Town Council of Aberdeen." It went without saying, he observed, that the ideal of the members of the Town Council was the greatest good of the greatest number. That was the policy that had always been pursued, and the present council, although they might exhibit diversities of opinion in some respects, were unanimous in endeavouring to promote the welfare of the people. In conclusion, he coupled the toast with the name of ex-Baillie Pyper, to whose good qualities of head and heart he paid a high compliment.

Mr. WILLIAM PYPER, replying, said he had been very pleased to accept the invitation of the society to be present and assured them that there was no society with which he was more heartily and thoroughly in sympathy. He proceeded to refer to the antiquated methods of the treatment of disease in animals, and to the great progress which had been made in this department of science since his young days. In conclusion, he extolled the great service Mr. M'Lauchlan Young had rendered in connection with the jubilee procession, and remarked that as lecturer in veterinary hygiene he was the right man in the right place.

Mr. BOYD proposed the toast of "The North of Scotland Veterinary Medical Society," remarking that it was a great pleasure for members of the Scottish Society to be in Aberdeen, and expressing the hope that they might again visit the Granite City.

Mr. ANDERSON, in replying, said that although the North of Scotland Society had been only a very short time in existence, it was making gratifying progress.

Mr. BARRON gave the toast of "The Chairman," observing that Principal Williams, an old classfellow, was an honour to the profession.

Principal WILLIAMS, replying to the toast, said he was pleased to hear Mr. Wilson speak of the educational question. He was entirely in accord with the opinions Mr. Wilson had expressed. He considered it an absurdity to compel students to waste their time in getting up Latin and Greek, when it would be much better for the advancement of the profession and for learning generally, if they were examined in French and German. It would, he added, be much more intelligible, much more rational and much more sensible if, instead of being compelled to learn the dead languages, students were compelled to learn Welsh, a beautiful language which was spoken in the garden of Eden.

This closed the proceedings.

Business Meeting.

The business meeting was thereafter held in the Agricultural Department at Marischal College. Principal Williams again presided, and there was a good attendance.

Mr. MOIR, the Secretary, stated that, in accordance with instructions received at last meeting, he had forwarded a communication to the Royal College of Veterinary Surgeons, pointing out that the clause in the Public Health Bill rendering the veterinary surgeon subordinate to the medical officer and the sanitary inspector in the work of inspecting dairy cows and animals intended for food was a great injustice; and suggesting that immediate action should be taken by the Royal College for the conservation of the interests of

the veterinary profession in Scotland. As the members were aware, continued Mr. Moir, the Bill had not yet passed, but immediate action by the Royal College was taken in the direction indicated. The Society had recommended Principal Williams and Professor M'Intosh M'Call for election to the Council of the Royal College, and both were elected by a large number of votes. A communication had been received from the Central Veterinary Medical Society suggesting the formation, as a means of commemorating the Diamond Jubilee, of a benevolent fund from which relief could be given to necessitous members of the profession.

The CHAIRMAN said he had placed himself in touch with the members of Parliament for Edinburgh and Midlothian in reference to the Public Health Bill, and they had done their very best to secure justice for the veterinary profession. With regard to the proposed benevolent fund, he contended that it was necessary, as a benevolent association had been founded 35 years ago, which had £7,000 unappropriated.

The meeting approved of the action of the Secretary, and took no steps regarding the proposed benevolent fund.

Louping-Ill Organism.

The CHAIRMAN followed with remarks upon the louping-ill organism, in which he referred to many thousands of experiments he had made in this country, and to the results of investigation he had made in Jamaica last year into the disease, from which the sheep in that country largely suffered.

Professor HUNTER, Edinburgh, then showed lime-light illustrations of the organism, which he fully explained. The organism is found in the tick which infests sheep and is communicated by that species of vermin to the sheep. In the tick the organism attains a stage of development it does not reach in the sheep, probably owing to the sheep dying before maturity is reached, for the organism does not appear to affect the parasite so injuriously as it does the sheep.

On the motion of Mr. BARRON, Principal Williams and Professor Hunter were cordially thanked for their instructive contributions.

Comparative Pathology.

The members at this stage adjourned to the pathological laboratory, where, under the guidance of Professor Hamilton, there was an interesting demonstration of comparative pathology.

Diseased Meats.

The company next repaired to the Medical Jurisprudence Lecture Room, where Professor Matthew Hay gave a demonstration on meat used for human consumption. For the first time, he said, the expression, "veterinary surgeon," had been introduced in the Public Health Bill in connection with unsound meat. Not only, as the Bill stood, might the medical officer and sanitary inspector examine unsound food, but a local authority might appoint a veterinary surgeon for the purpose. He had no doubt that many local authorities would, as opportunity offered, take advantage of that, and appoint veterinary surgeons to co-operate with the sanitary authorities in the examination of meat. Then the veterinary surgeon, under the Contagious Diseases (Animals) Act, could, on payment of a fee fixed by the local authority, be compelled to make an examination of a carcase, and to certify whether it was sound or not, and upon that certificate being given the butcher was subsequently exempted from any penalties. Then, in connection with the examination of live cattle, it would be absolutely necessary to have the help of a veterinary surgeon. For the first time in a general Act applicable to Scotland it was proposed that live animals should be open to inspection and also to con-

demnation, and he did not think a medical officer of health, still less a sanitary inspector, would venture to examine a live animal, and condemn it. Proceeding, he pointed out the difficulties in the way of detecting disease in carcases, stating that an accomplished pathologist might be unable to judge of the disease from which an animal suffered owing to the absence of the viscera. The system was largely a system of detection, not inspection. Proper inspection ought to take place in the slaughter-house at the time of killing, and before the organs were removed. Such a system would be far more satisfactory to the butchers as well as to the public. He went on to say that in Aberdeen last year 42,000 cattle, 40,000 sheep, and about 2,000 pigs were slaughtered. This was far in excess of the wants of the community, and large supplies were sent to the London market. The quality of the cattle slaughtered in the city was considerably above the average; they were for the most part comparatively young animals of two or three years of age. The proportion of cows slaughtered was small; so that they did not meet with the same number of diseased carcases as were met with in towns further south. The disease most frequently met with in Aberdeen was tubercle. Fully a third of the cattle they found it necessary to deal with suffered from tubercular disease. Carcases of cows that had suffered from puerperal fever and of animals that had suffered from anthrax—these very rarely—were also met with. They did not find very much disease in sheep. He had not met with tubercle in sheep although a disease due to a small worm was sometimes found which closely resembled tubercle, which no doubt many had mistaken for it and which had given rise to the belief that tubercle was met with not unfrequently in sheep. Swine fever and measles were the commonest diseases in pigs. Dr. Hay went on to demonstrate the appearance of the tubercle as found in the organs of cattle, and to illustrate his observations by specimens. There were different opinions as to what should warrant one in condemning a tubercle carcase. Some veterinary surgeons were inclined to be a little less severe in this direction than perhaps medical men would be. His experience was that if they found distinct tubercle manifestation about a carcase it ought to be condemned. The muscular part of the carcase was rarely tubercular, however, and if it were well cooked the germs would be destroyed; and he would not be particularly sorry if the authorities were, as in Paris, to allow tubercular animals to be sold after being cooked under municipal supervision, provided the animal were not wasted. In conclusion, Dr. Hay demonstrated the manner in which fish became affected by decomposition.

On the motion of Principal WILLIAMS, Dr. Hay was cordially thanked, and the proceedings closed.

LANCASHIRE VETERINARY MEDICAL ASSOCIATION.

A SPECIAL meeting was held at the Grand Hotel, Manchester, on Tuesday, May 4th, at 6 p.m. Mr. George Morgan in the chair. There were present over 20 members and visitors.

DOCKING.

BY WM. WOODS, F.R.C.V.S.

Gentlemen,—The following circular received, I suppose, by veterinary surgeons generally throughout the country, is the only excuse I have for inflicting upon you a number of arguments with which you are no doubt perfectly familiar. But the issue is of so great importance, that, though I am sorry there should arise any necessity for it, yet I do not feel that it requires an apology on my part. The circular is as follows:—

"At the Halifax Borough Police Court on Friday, the 9th of April, Mr. John

Appleyard, M.R.C.V.S., was charged at the instance of the Royal Society for the Prevention of Cruelty to Animals, with cruelty to a horse, the alleged cruelty being docking. The Society was represented by counsel, and had a Professor and other professional witnesses in attendance at the Court, ready to give evidence on behalf of the prosecution. Counsel stated to the Court that the issue was simple, *i.e.*, in effect, whether or not 'docking' was cruelty within the meaning of the Act. Mr. Appleyard, having only a few days' notice of the charge preferred against him, was quite unable to prepare his defence. Messrs. Walker and Briggs, on behalf of the veterinary profession, hackney breeders, and dealers generally, took upon themselves to advise him to apply for an adjournment, so that the whole question might be fairly and fully placed before the court. An adjournment was granted."

Now, gentlemen, this is a very serious matter for those veterinary surgeons who conscientiously believe docking to be a necessary operation, who feel themselves perfectly qualified to judge as to whether docking is or is not necessary, and who feel that to refuse to dock a horse may be the cause of an accident to the owner or driver, although generally speaking this last would not occur owing to the fact of the operation being so simple in character, that if a veterinary surgeon refused to dock it, someone else, less qualified to do so in the most humane manner, would at once take the job in hand.

Before speaking of the operation itself, I want to draw your attention to what has been going on for the last few years. First of all, so far as we are concerned, the subject was introduced at a National Veterinary Congress about 12 years ago, and I want to refer especially to a speech of Mr. Colam, the Secretary to the Society. He made two important statements. The first was that with respect to the cruelty of docking he expressed no opinion. He was simply guided by those who advised him professionally. The second was that veterinary surgeons seemed to think that with regard to docking they were outside the pale of the law. Well, with regard to this second statement, there is no doubt but that veterinary surgeons do feel that they are the persons who ought to be considered authorities as to veterinary surgical operations, and they may well feel sore at an outside body endeavouring to brand with the stigma of cruelty a whole profession which has been remarkable for its self-sacrificing generosity in the interests of the country at large, and which has willingly and eagerly assisted in the curtailment of its own income in dealing with the contagious diseases of animals. I believe they, *i.e.*, the veterinary profession, also dispute the opinion that docking is illegal, believing that the verdicts the Society has managed to obtain have been snatched in a manner not quite agreeing with the English idea of fair play. Let me give you an example. Some years ago I happened to be called in consultation into the Lake District, and after I had finished my business, as I had an hour or two on my hands, I strolled into the court, where I heard a horse case was going on. This is what I found. Two men, apparently anything but well off, and as I gathered, handy men upon a farm, who occasionally turned their hand to horse-breaking, were summoned for this same offence of docking a horse. The Society was prosecuting, and this is what I want you especially to note—a barrister from London was conducting the case on their behalf.

This case was the one that opened my eyes to the Society's methods. Here were two poor men in a country town against whom the Society were so eager to obtain a conviction, that a barrister from 300 miles away was conducting their case. It followed in my mind that the Society's intention was later on to come before the world with a string of cut-and-dried convictions in proof that it was generally accepted that docking was a cruel and unnecessary operation.

Since then I have been watching and waiting for this docking question to come on in a more prominent form, and in Mr. Appleyard's case I am awaiting with some curiosity their mode of procedure. Will they fight out the question of docking on its merits, or will they simply try to show that docking is already by law cruelty, and that consequently no veterinary evidence to the contrary can alter the law. I have omitted the verdict in the case just referred to; it was in these words, given by Mr. Wakefield, a north country banker, "Docking, if properly performed, is a necessary operation, and there is no evidence that it was improperly performed. The case is therefore dismissed."

I now return to the first of Mr. Colam's remarks, viz., that with respect to the cruelty of docking he expressed no opinion, but was simply guided by those who advised him professionally. Now, it is one of my failings to analyse a statement of this description, and I say distinctly that the meaning of that statement is neither more nor less than that the whole profession is to act according to the caprice or fancy mainly of Professor Pritchard, or whoever Mr. Colam may select to give him the advice he wants, so I need make no apology if in this paper I deal mainly with Professor Pritchard and his arguments. Now, Mr. Pritchard is a man for whose opinion I may be allowed to say I entertain some respect, but it is as well to remember that it has taken him somewhere I suppose between forty and fifty years to discover that docking is cruel and unnecessary; because we can scarcely suppose that when professor at the Veterinary College he would allow himself to teach his students to perform an operation which he felt was both cruel and unnecessary, without making some stronger comments than from enquiry I can discover that he did make up to the year 1880.

I now come to a very short description of the operation itself. Docking consists in the removal by amputation of usually from four to eight inches of the end of a horse's tail. It is performed, generally speaking, by one of two methods. The hair of that part of the dock it is intended to leave is turned up and tied by means of a piece of string, which also acts as a tourniquet, a ring of hair is removed with the scissors at the seat of operation, and by means of one sharp movement of the knife of the docking machine the desired length is amputated. The stump is then either seared by means of a hot iron, and perhaps some melted resin, or a strong styptic is applied to the end of the tail by means of a pledget of tow or cotton wool, tied and kept in position by the aid of the remaining hair. I am anxious to point out that which of these two methods is the better has nothing to do with the question at issue, and should be eliminated entirely from the discussion. The only question we have to consider is: Is docking a necessary operation or not? What is the best method of performing the operation? This, I trust, is a sufficient description of an operation we all of us know all about.

The next question is: For what purpose is the operation performed? The answer is: For the greater safety of the persons using those horses; and I take my stand upon this assertion that, if by docking all the horses that England contains, one human life can be saved; if it can be shown that by docking any number of horses human life is less in jeopardy: that we are not only justified, but that we are compelled to adopt that precaution, and to recommend its adoption generally. That is my proposition. That is the statement upon which I either stand or fall. Now, then, can it be shown that the probabilities are that there will be less accidents and less liability to accident from a docked than an undocked horse? The shortest way to deal with this is to take the arguments against the operation and endeavour to show where they are wrong; but before I do that I wish to take you back again to the Congress of 1884, at which I need scarcely say the preponderating, nay, overwhelming opinion of veterinary surgeons was in justification of the

operation. The result of that Congress was a circular issued by Mr. Colam to veterinary surgeons, which I now proceed to read to you:—

ROYAL SOCIETY FOR THE PREVENTION OF CRUELTY TO ANIMALS.

August 6th, 1884.

Docking Horses' Tails.

DEAR SIR,—On Thursday last, by invitation of the President, I attended the British National Congress at Manchester, when a discussion took place on the above subject. The remarks made, and the opinions expressed, on that occasion may be summarised as follows:—

(1) That the prosecution of a veterinary surgeon for docking a horse's tail is regarded as a matter of sincere regret by the profession.

(2) That though indiscriminate docking by dealers and others cannot be justified, instances are brought before veterinary surgeons in which it is desirable and sometimes necessary to perform such surgical operation, and that veterinary surgeons are obviously, therefore, the most competent persons to determine whether the operation shall be performed or not.

(3) That the Society ought to be guided on this subject by the opinion of the profession.

Having reported the above, I am directed to comply with the recommendation of the Congress by placing before you the inclosed questions, and by asking you to do us the great favour of answering the same, and returning the form, filled up, in the envelope sent herewith as early as possible, in order that we may have time to consider the subject at the end of the present week, after which our long vacation will commence. I need not add that, personally, I shall esteem it a great advantage to have the assistance of your candid opinions on these questions.

The Society has the best reasons for desiring to avoid mistakes, while it is bound to do its duty according to the best light it can obtain. If docking had been carried out with moderation, probably the Society would not have been driven into opposition against it, but, as you are aware, dealers and blacksmiths have conducted the practice so unsparingly that public opinion has been provoked into strong expressions of disapproval, and the Society has been compelled to interpose. Indeed, in many parts of the country the operation is being performed almost entirely by copers, farriers, gelders, and other unskilful persons, whose faults have scandalised veterinary surgeons unjustly. The Council of the Society cannot but know that these men are often guilty of abuses which ought to be attacked (though it may not be easy for veterinary surgeons to do this), and they desire to discriminate between such abuses and legitimate operations performed by veterinary surgeons in the exercise of their profession. And, for this reason, they have cordially fallen in with the recommendation of the Veterinary Congress by submitting the enclosed questions to you, believing that your answer will be dictated by considerations of mercy and justice, as well as by a sense of responsibility arising out of your high calling.

I am, sir, yours faithfully,

JNO. COLAM, *Secretary.*

Now, I ask you to consider this circular carefully, in view of what is the action of the Society now. It states that the Council of the Society have cordially fallen in with the recommendation of the Veterinary Congress.

Now, the main recommendation was "That the Society ought to be guided on this subject by the opinion of the profession." I ask, Have the Council of the Society acted up to its word upon this question? because that is the jury which I wish along with the Society that the question should be referred.

That is the jury to which I am now referring it, and to the verdict of that jury I am willing to bow, and I challenge the Society to take the verdict of that jury, or else to acknowledge that this circular was not an accurate statement.

I feel certain that the veterinary associations throughout the country will give every facility for Professor Pritchard to explain his views on docking, and all that will be necessary afterwards will be a resolution at each Association that docking is unnecessary and therefore cruel, and unless his experience of other associations differs from the Yorkshire, at a meeting of which he read a paper on this subject, not a single voice will be raised in his favour. I will now proceed to give you Professor Pritchard's arguments against docking.

1. That it caused pain. This he said was denied by some veterinary surgeons.

2. That a horse with a long tail curved artistically would not be so likely to get over the reins as a docked horse's tail, because the long tail swayed from side to side when used for the purpose of brushing flies from the quarter and croup, whereas a short tail stuck straight out, like a poker, from the sacrum, and was consequently more liable to be flicked over the reins.

3. That a horse never forgot it if once docked.

4. That the end of the tail was very much more sensitive after docking than before.

5. That he had never had a horse get its tail over the reins when he was driving, and had never seen it but once, and upon that occasion a youth was driving.

6. That if a person could not drive a horse sufficiently well to keep the reins from getting under the tail, he ought not to drive at all.

7. That anybody who knew anything about racehorses knew perfectly well that a racehorse could not be trained if docked, because of the irritability of the animal caused by being unable to remove offending bodies from the croup, etc.

8. That the tail greatly assisted in steering dogs, as you could see if you would watch a collie and a fox terrier rush down a street and then see them turn a corner, the collie turning with ease, while the terrier would get six or eight yards before being able to turn.

9. That Nature never does anything in vain, and hence that if a horse's tail would have been better short it would have been made short, and that if a horse's tail was not intended for use it would not have been placed there.

10. That cutting off the hair level with the end of the stump would answer every purpose of docking without being of pain to the animal.

11. That by docking you took away from the animal Nature's provision for the removal of offending objects from the quarters.

12. That because of these reasons docking is unnecessary and therefore cruel.

I will now try to place before you the answers to Professor Pritchard's arguments. First of all as to the pain caused by docking. Professor Pritchard is the only one I ever heard assert that anyone said that docking was a painless operation, but I tell you this, I have pricked with a pin many undocked horses' tails, and my experience has been that for three or four inches from the end of the dock there is remarkably little sensibility. I have pricked tails, and many times there has not been the slightest movement of the animal, nor any desire to remove the tail from my hand. I ask you, gentlemen, to try this, and I think you will be surprised at the little sensibility there is in the tail towards the end, although if you will think of it, the fact that one is almost compelled to dock a horse with a bruised tail, if the bruise is in any way severe, in order to effect a cure, proves that the tail is

only endued with a low degree of vitality. At the same time, the statement that docking causes pain will, I think, be agreed to *nem. con.*

The second argument that a docked tail is more likely to get over the reins than an undocked one is more difficult to agree with, especially in face of the fact that I remember a mare that was docked three times, until she had only about six inches left, because she was such a brute at getting her tail over the reins; and it is certainly not the opinion of many people I have asked who I thought would be likely to know. No doubt during the remarks which may follow something will be said by the members bearing on this subject, but Professor Pritchard seems to have omitted one consideration, and that is that the danger commences after the animal has got the rein under its tail. How to quickly remove that rein before the horse has landed you into the ditch becomes the burning question, because you can't well steer a horse with only one rein. Whether it is easier to remove a rein from under a tail a foot long or eighteen inches long? If a horse is to commence kicking immediately the rein gets under the tail, then it will make very little difference as to the length of the dock; but the performance, as I have seen it, is pretty much as follows:—The rein is immediately gripped tightly, but the animal continues to trot on, and provided he is not pulling at the bit with the rein that is under the tail, all that is wanted is to allow the rein to become quite slack, when the tail will quietly relax its hold, and enable the rein to be removed; but if in the removal the rein happens to touch the tail it is immediately gripped again, and the same process has to be gone through as before. Now, one more grip may make all the difference between safety and an accident, and I think it stands to reason that the shorter the passage the rein has to take the less the chance of its touching the tail a second time. I saw it stated somewhere that the stump of a tail after docking is far more powerful, and can hold a rein far more firmly than before. I don't see how there can be anything in this argument, but anyone who thinks he is going to pull, by main strength, a rein from under a tail, whether docked or undocked, will, I think, find himself grievously in error. As to the gentle swaying from side to side of a tail if it be undocked, and the jerky movement of a docked tail, I have only to say that docking puts no more muscles into a horse's tail, nor do those muscles previously in the tail contract in any different manner.

The next argument, that a horse never forgets it if once docked, appears to me a very wild statement, and is, I think, completely answered by Professor Axe's retort that "psychological research has not yet attained to that state of perfection to tell what is going on in the mind of a horse."

My answer to the next argument, viz., that the end of the tail is very much more sensitive after docking than before, is equally short. My experience is that there is remarkably little sensibility at the end of a tail either before or after docking.

I think the next two statements had better be taken together. If the Professor has never had a horse get his tail over the reins, he cannot be considered much of an authority on this point, and not only so, but I think we may take it for granted that for the greater part of his life, especially that part of it when he was learning to drive, and before he found out that docking was unnecessary, he drove docked horses, which may account for his immunity in that respect.

Argument No. 7, viz., "That anyone who knew anything about racehorses, knew perfectly well that a racehorse could not be trained if docked," I wish to draw particular attention to, because it struck me that if that were so, it was proof that with thin-skinned horses, at all events, docking should be avoided as much as possible. I took the trouble to enquire into this rather carefully, and I will give you the result of my enquiry. The first person I

asked was what is known as the head lad in a well-known training stable. The head lad, I may explain, is the person who is a kind of foreman over the lads that groom and ride the horses, and is not necessarily a lad at all. In this case he was, I should judge, between 35 and 40 years of age. His reply to my question was that he had never heard anything of the kind, and did not believe there was anything in it. That answer, I thought, was not proof, so the next person I asked was one of the best known trainers in England. His answer was characteristic of the man, and was certainly definite. It was a gem not to be lost, so I give it you word for word. It was, "What rot! What a devil of an idiot the man must be. You can cut the tail off altogether if you like and it would make no difference." This I took to be an answer calculated to convince the most sceptical, but as I happened to meet a gentleman who trains racehorses on the Continent, I thought I could do no harm by asking him as well. This gentleman—by name Mr. Corser, of Turin, in Italy—told me of a mare trained at the time by Hesp, the trainer of Kincsem, a mare by Ostragar, and trained in Hungaria, was docked because of a diseased tail, trained, and won a race afterwards. I make no further comment, except to ask Professor Pritchard where he got his information on this point, as I can scarcely conceive that he would in a prepared speech make a statement of this description unless he had some foundation for it.

Argument No. 8 appears to me equally extravagant. It is that the tail acts as a steering gear, that it enables the animal to turn quicker, and so on. This, I think, is entirely and wholly disproved by Nature herself, for the particular class of animal that can twist and turn quicker than any others with which I am acquainted have no tail worth mentioning. I refer to the Rodentia, hares and rabbits. But, if it were true, would it not be a strong argument in favour of docking. I have never known a horse, willing of himself to turn, have any difficulty, owing to his short tail, to turn round either a street corner or in his stall; but I have known of many cases which would have been docked very short indeed if by so doing it would have prevented them turning quite so quickly as they were in the habit of doing.

Argument No. 9. That Nature never does anything in vain, and that if the horse's tail would have been better short it would have been made short, and if it was not intended to be of any use it would not have been placed there. No one, I think, contends that a horse's tail is of no use, but as against that argument I have not yet heard of a thoroughly satisfactory explanation of the use of a pig's tail, in fact the only attempt at an explanation I have heard was that it assisted in holding it down on a tressle while it had its throat cut; but if a use is found for a pig's tail an explanation will have to be given as to why it is that, if useful, nature allows so many pigs' tails to slough off until not an inch is left. No! it is a sentimental argument that won't hold water. It might perhaps be held that Nature is the best exponent of what is necessary in a state of nature, but put Nature under artificial conditions and I do not allow that Nature cannot be improved upon.

The next two arguments had better be taken together as they answer each other. If by docking you take away Nature's provision for removing flies from the quarters, so you would by cutting off the tail level with the stump. If it be cruelty to take away Nature's provision for removing flies from the quarters, then it is cruel to cut the hair, indeed more so than docking, because generally speaking the hair left on a docked tail will extend further than the length of the original dock, and I directly traverse the statement that cutting the hair level with the stump would answer every purpose of docking. You have only to get jammed in a narrow lane out hunting and see an undocked animal whisk his tail over the reins of the horse immediately behind him to show you the fallacy of this. If only hair crosses the reins

nothing happens, but if the dock itself gets over it will fasten the rein tightly, rendering the horse whose rein is attacked quite beyond the control of the rider, and will very probably set the horse whose tail has caught the rein both bucking and kicking.

I think I have now met the whole of the arguments I have ever heard against docking, and I am now only going to detain you a few minutes on my opinion of the action of the Royal Society for the Prevention of Cruelty to Animals. I remember that at the first National Veterinary Congress held in London, Mr. Colam was highly indignant at the suggestion being made that the Society was governed by a lot of sentimental old ladies, but the Society itself seems to be endeavouring to prove that it is so. If Mr. Colam wants to advertise the Society with the object of obtaining subscriptions from a quantity of sentimental persons who know nothing whatever about this particular subject, he may be going the right way about it; I do not know. But if he really wants to suppress docking, let him persuade the Royal Agricultural Society that it is unnecessary and, therefore, cruel. Let him endeavour to show the judges at horse shows that docking is unnecessary, and that will do more in twelve months to stop docking than all the prosecutions he has undertaken. But Mr. Colam knows perfectly well that it is no use trying to persuade horsemen not to have horses docked, and, if he does not know, he ought to know that the only way to stop docking is to convert public opinion. To prohibit veterinary surgeons from docking horses would simply mean to transfer the performance of that operation to another class of individuals not so well qualified to perform the operation in the most humane manner possible. As it is now, not one-half the horses one sees docked are done by veterinary surgeons. So simple is the operation to perform that grooms, horsebreakers, and blacksmiths are the usual operators; and whoever docked one for a dealer I should like to know? Finally, just a word on the financial question. It surely cannot be seriously argued that a profession which has laboured so hard and so heartily in supporting those effective measures which have cleared the country of the cattle plague, pleuro-pneumonia, and foot-and-mouth disease—with how great detriment to its own financial interests, only those veterinary surgeons who flourished in the years when these diseases were rampant fully appreciate, but all of us know the loss to ourselves must be very considerable from their extinction; yet I answer for it, that not even the poorest of us will have them back if any efforts of ours can prevent it—and will a profession with a history like this support cruelty for the few pounds per annum that it would gain? Gentlemen, I will not argue the point; it is not worthy of argument. It must be granted that if veterinary surgeons maintain that docking is a necessary operation it is because they honestly and conscientiously believe that it conduces to the greater safety of the persons using horses, and if there are a few veterinary surgeons opposed to docking, so there are medical men opposed to vaccination.

I conclude by proposing the following resolution :—" That in the opinion of this Society the docking of horses is a necessary operation."

This was seconded by Mr. HOPKIN, and carried unanimously.

CENTRAL VETERINARY MEDICAL SOCIETY.

AN ordinary general meeting was held on Thursday night the 3rd instant, at the Royal College of Veterinary Surgeons, 10, Red Lion Square, Bloomsbury; Vet.-Lieut.-Col. Kettle, A.V.D., the President, occupying the chair. The other Fellows present were :—Messrs. W. F. Barrett, J. Baxter, J. K. Bruce, A. L. Butters, F. W. Dowell, H. Edgar, A. E. Gostling, H. Gray, J. S. Hurndall, C. J. Humphreys, W. Hunting, Vet.-Lieut. P. J. Harris, A.V.D., Hugh A.

MacCormack, Professor J. Macqueen, F. C. Mahon (Hon. Sec.), W. Perryman, R. Porch, F. Samson, H. Singleton, W. E. Taylor, P. Vincent, and six others.

On the motion of Mr. HURNDALL, seconded by Mr. BARRETT, the minutes of the preceding meeting were taken as read and were confirmed.

A letter was read from Mr. J. Rowe, the Honorary Treasurer, stating that he was unable to attend in consequence of his having another engagement.

Nominations.

The following gentlemen were nominated for election as Fellows of the Society at its next meeting.—Vet.-Major J. J. Phillips, A.V.D., of Woolwich, S.E.; and Mr. Hagmier, 413, Mile End Road, E.

The Sale of Veterinary Drugs.

Mr. GOSTLING called attention to a matter which had come under his notice which he considered deserved some attention from veterinary practitioners. He alluded to an offer on the part of a firm of wholesale druggists to supply drugs to veterinary surgeons' clients at the same prices that they charged to members of the profession.

After some discussion,

Mr. HURNDALL proposed, and Mr. SAMSON seconded, the subjoined resolution, which was carried unanimously:—"The members of the Central Veterinary Medical Society desire to notify you that it has come to their notice that you are issuing a price list to horsedealers and other private horseowners offering to supply drugs at prices similar to those quoted to the profession. The members of this Society regret to observe this, as it cannot but be prejudicial to the interests of the profession, of whom many are your customers."

The HON. SECRETARY (Mr. F. C. Mahon) was directed to send a copy of this resolution to the firm concerned.

THE SUPPRESSION OF RABIES.

Mr. W. HUNTING said: I propose to-night to refer to some of the various points concerning rabies shortly, but sufficiently, I hope, to evoke discussion. First, as to the prevalence of the disease. At the present time there are some twenty different counties in Great Britain unaffected with rabies, but the facility with which dogs are moved by train from one part to another renders it likely that the disease may be taken from one county to another in the course of a few hours. Of the last two cases of rabies I have seen in London, one of them had only been in town a week. It came from Paris. The other had been in town one day. It came from Hampshire. That seems to me a danger worth noting, because it shows the importance of enforcing any regulations not after a place has become thoroughly infected, but on the very first appearance of the disease in the district. I have a tabular statement here showing the cases that occurred during the first sixteen weeks of this year from moving. Worcestershire, Herefordshire, and Gloucestershire had no cases up to the twelfth week. Then there is a remarkable occurrence. In the 12th week one case appears in Worcestershire, one in the 13th week in Herefordshire, and one in the next week in Gloucestershire. Then again there is another case in Gloucestershire and another in Worcestershire. Doubtless if one could trace those cases one would find they were just over the boundary, and the point I want to make is that if rabies regulations were enforced on the appearance of the first case in Worcestershire, it is possible we should not have had the other cases subsequently in the neighbouring counties. Now as to the method of the

spread of this disease. Of course practically all cases are spread by the bite of a dog. But you will remember that some time ago an outbreak of rabies occurred in England among deer. At first you had three or four cases at a time, then a week elapsed and you had three or four more, and then a further period passed and more deer were attacked. This was the experience in the large herd at Richmond Park and in the Marquis of Bristol's place in Suffolk. It seemed as though the disease was spread by the deer from one to the other. Another explanation was that some dog had bitten the whole of them at one time, but this could not be reconciled with the repeated outbreaks. Deer have a habit of licking each other, and rabid deer have a particular partiality for licking and to such an extent as to abraid the skin. I think there is very little doubt that deer have the power of spreading rabies among themselves by licking when once the disease has got into a herd. This disease with its long period of incubation, is doubtless often due to the importation of a dog with the disease undeveloped, but latent, into a district previously uninfected. In this way dogs brought from abroad, in an apparently healthy condition, are a great danger. In my experience there have been two or three distinct increases of rabies in this country. The first one, I remember, followed the Franco-Prussian War. At that time there is no doubt people who went abroad took their dogs with them. The dogs were bitten abroad. When those dogs were brought back they infected the localities to which they returned. Up to the year after the Franco-Prussian War rabies in London, so far as I know, was very uncommon. Two or three years afterwards, however, the disease increased to an enormous extent. At that time, too, I noticed that the dachshund was the most commonly infected. It was then the most fashionable of imported dogs. About the same time there was an outbreak of rabies in America, and there the most remarkable thing was the Pomeranian was the dog most frequently infected. That was the then fashionable dog in America and it was an entirely imported dog. I mention this because I think the importation of rabies has not had sufficient attention drawn to it.

As to the term of incubation, my own experience induces me to fix it at about 25 days. I believe there are cases where the period is as short as 14 days, while in others, it is said, rabies does not develop for twelve months. In the only two carefully observed cases that I remember to have heard of where the period was very long, the dog was kept in a state of confinement, and it has often occurred to me that possibly keeping the dog locked up, perfectly quiet, may prolong the period of incubation, whereas if the animal be allowed to roam about subject to accidents and injuries the disease might prove shorter in its period of incubation. As to the duration of the disease itself: this is exceedingly important as an aid to diagnosis in some cases. As far as I know the majority of cases die on the fifth day, and none of them live over eight days. Therefore, in a case of doubt, if a dog is kept under observation for a period of eight days, and is not at the end of that time distinctly rabid, there need be no fear whatever as to the condition of that dog. Very often we have had discussions on what are called "premonitory symptoms." I do not believe in the existence of any premonitory symptoms of rabies. I believe that from the very first symptom of any kind which shows itself—from that period, and possibly even antecedent to that period, the dog is infective, and potentially able to cause rabies by biting another animal. There is in a well-trained class of dog and pet dogs a period of comparative harmlessness. A well-trained dog, in the first stage of rabies, seldom bites its master or mistress, though it might possibly attack a stranger. A test of rabies is, no doubt, the disposition of an infected dog to attack other dogs. I have never myself seen a case of the sudden development of rabies, but I believe one or two such cases are on record. One is where some boys

in France caught a dog, and castrated him. He bolted, swam across a river, bit some sheep, and the sheep so bitten died of rabies. If the dog had not been castrated he might, however, still have been infective.

As to the symptoms of the disease, we have the two forms—the so-called violent and dumb rabies. I notice that in the London County Council's handbill descriptive of the symptoms of rabies no hint is given to the public that a dog may look perfectly harmless, and yet be virulently rabid. In this notice mention is made of a dog's change of habit, restlessness, desire to hide in dark and secluded places, depraved appetite, altered ovia, fits of excitement, and so on, but no mention is made of the fact that some of the most dangerous kinds of rabies show none of those signs whatever. The popular idea of a mad dog is a dog with convulsions. All through the summer policemen kill heaps of "mad dogs," none of which are rabid, most of which are puppies, and all of them howling and foaming at the mouth and running round in a big circle. One would think that by this time the police and the authorities might have got past that stage of ignorance. To my mind there is very little difficulty in a veterinary surgeon diagnosing the disease in the living animal. I say very little difficulty because I admit there are some cases in which the symptoms are almost negative. I set a good deal of store myself upon the appearance of the dog's eye. There is a sort of glassy, stupid expression of the eye in a rabid dog in the very early stage of the disease. If you want to develop the symptoms the best thing to do is to tie him up or put him in a cage. If you have a rabid dog, no matter how quiet he is, and tie him up, put him in a cage and annoy him, he will never fail to manifest violent symptoms at once. Some cases there are where the symptoms are very badly marked at first. I remember one in particular where the dog would not eat and that was the only symptom his owner had seen. The little dog was running about the garden and I noticed that every now and then he stopped and made a movement of deglutition. He was attempting to swallow his own saliva. The difficulty in the act was very marked but might have escaped a non-professional man. When he tried to swallow he stood and brought his nose towards his chest. That symptom was the only one at the time which really made me suspicious. The disease rapidly developed. When a rabid dog is tied up or put in a cage his method of drinking is, I think, very significant. He dips his head deeply into a vessel of water and will lap sometimes for five or six minutes at a time and yet not swallow. When the dog has finished lapping you will find the water left in the vessel is thick with the admixture of saliva. That, I take it, is a very significant symptom of disease.

As to *post-mortem* lesions, using the word lesions in the strict sense, there are none. At any rate, I have made a large number of *post-mortems*, and I have failed to find any characteristic lesion of any organ in the body which would enable me to say that the dog was suffering from rabies. Of course, there is a sign we often get, a sign that is very seldom absent, and that is the presence of strange, foreign substances in the stomach. Sometimes we find the stomach absolutely empty save for such odd things as a couple of matches, a bit of carpet, little bits of wood, a piece of a jam pot, and various other things of that kind. Very rarely have I found food in the stomach of a rabid dog. When one has both the opportunity of examining a rabid dog during life and making a *post-mortem* examination afterwards, I believe that any man of experience can express an opinion as to this disease as positively, and is as likely to be right, as if recourse had been had to the inoculation test. Of course, there are all the negative symptoms, such as the absence of other diseases. It is possible for a puppy to have rabies, but in ninety-nine cases out of a hundred all the violent and exciting symptoms shown by puppies are due to convulsions; and it is worth while to remember that

puppies have almost as curious tastes as rabid dogs. They eat all kinds of things; we find bits of cotton, of carpet, portions of slippers, all manner of odd things in the stomach of a puppy which is not suffering from rabies. The inoculation test I regard as absolutely certain, not, however, after the inoculation of one rabbit only. To inoculate one rabbit and wait for its death may be very suggestive if it happens to die twelve or fourteen days afterwards, and to have paralysis of the hind quarters. But there is always the possibility of being wrong with one. If, however, the operator inoculates two or three rabbits, and they all die about the same time, and all with the same symptoms, then rabies is established beyond the possibility of doubt. Most local authorities now require the adoption of this test, some compelling it to be carried out. With the knowledge that a dog has bitten a human being there is now no excuse for not submitting that dog to the test of inoculation.

With regard to suppressive measures, the law at present directs compulsory notification of the disease by the owner, inspection, slaughter of the diseased and bitten animals—if bitten by a distinctly rabid dog—and isolation of the suspected. All these things are required under the latest rabies order of the Board of Agriculture. The local authorities are obliged to carry them out. Every one of them I approve of. The Board of Agriculture have reserved to themselves the right to issue a muzzling order, and local authorities cannot now issue such order. In relation to a muzzling order there are many considerations worth discussing. When such order is wanted is the first consideration. I hold that it is a great mistake of the authorities to wait until there are a number of cases before putting the muzzling order in force. There were ten cases from the beginning of this year in London before the muzzling order was enforced, while in Lancashire there were nine, Yorkshire five, Gloucestershire five, Middlesex four, and so on. It seems to me that if the muzzling order is to be effective, it should be enforced in any district at the outbreak of the first case. It should be applied not for long, perhaps, or over a considerable area, but when you have one case in a district, if you apply the order—say within a ten-mile radius for a month—the possibility is you will catch the next case and prevent any further spread of the disease. We know, of course, that a rabid dog may travel more than ten miles. If, however, he travels ten in a straight line it is an unusual occurrence. He may circuitously travel forty miles, and yet never get out of the ten-mile radius. I think a ten-mile radius would be sufficient for the enforcement of a muzzling order on the appearance of the first case of rabies. Where you have a number of cases the area should be increased to at least ten miles outside every case, so that the area involved might cover 30 or 40 miles. Then for how long should the order be operative? I think a rabies order ought to be in force for at least three months after the last case appears. I do not think it is worth while annoying all the dog owners by keeping the order going for six months unnecessarily. There may be more cases but there will be very few, and you have to consider the amount of annoyance you are causing the public, and to render an order effective you must enlist as far as possible the hearty co-operation of the dog owners. Without the co-operation of the dog owners it is difficult to enforce any suppressive measures. It has been suggested that the only logical thing to do in an island like this, is to enforce a muzzling order generally, over the whole country for a period of six months or more. Yes, that is very logical and it would be very well if we were all philosophers, or inhabitants of Jupiter and Saturn; but to my mind it is not a practical order to enforce in Great Britain at all. There are entire districts, county after county, absolutely free from rabies. In the North of Scotland, for instance, there has never been, I believe, a case of rabies. Well, what is the use of enforcing an order there? The effects of a universal order would be to render the order absurd and to induce a great

deal of grumbling and objection. You cannot, without annoying people, impose upon them a coercive regulation when that regulation is not locally required. By applying the regulation to every case as it appears and by increasing your area if you have two cases you can equally well suppress rabies. I say that because the disease has been repeatedly suppressed by a muzzling order and in many places—London, Edinburgh, and other places—there was a fresh outbreak simply because the regulation was not continued long enough. With regard to past muzzling orders it is to be remembered that no special muzzle was enjoined. Everybody used what muzzle seemed good to him. Many people cut the front of the muzzle and hundreds of muzzles did not prevent a dog from biting. Lots of them were worn round the neck or on the ear. Still, rabies was stamped out. What does that mean? It means, I think, that the muzzle is simply a token, and the essential part of a muzzling order is the immediate destruction of diseased dogs. People in a house, at any rate, wherever they have had one case of rabies, look pretty sharply after their dogs. In the street, a wandering dog belongs to nobody, and is not looked after unless the police look after him. When a muzzling order is enforced, no matter what kind of muzzle is prescribed, a dog found unmuzzled is seized by the police and—I was going to say—forthwith slaughtered. But he ought to be slaughtered. Nothing strikes me as greater folly than seizing and collecting all the mongrels and escaped dogs in London, taking them to the Dogs' Home, and, after detaining them there three or four days to see whether owners turn up, selling them to whoever may care to buy them. It may be that this brings grist to the Dogs' Home. No doubt the managers of that Home have great expenses, and the sale of these dogs yields the Home some money. But when you have once caught a dog during the prevalence of rabies in a district, that dog should never leave the Home alive unless he is claimed by his owner. If rabies is about, who knows which of the dogs seized and removed to the Home may not have been bitten by a rabid dog. Failing this knowledge, and if the animal is not claimed by his owner, he should not be sold to an innocent purchaser, but should be destroyed. With regard to exemptions from the muzzling order, I cannot understand upon what grounds of logic or expediency an exemption is based. I do understand that during the hunting season, when hounds—deemed essential for sporting purposes for the rural social arrangements of England, and the health and happiness of many people—are well looked after they may consequently be fitly exempt during the hunting months. But for this season only should they be exempted from the operation of a muzzling order. Then, to be fair, you should exempt the shooting dog during the shooting season. I know nothing about the training of greyhounds and, therefore, I do not know during what season they might be exempt. But it strikes me that from April up to, say, the end of July, there ought to be no exemptions whatever. One is met with a difficulty, perhaps, in the case of the sheep-dog. But the sheep-dog is not always used for rounding up sheep. Unless he is in the absolute act of doing so, for which his muzzle might be altered in front by the owner, and the proceeding winked at by the police, I see no reason why the sheep-dog should not be muzzled the same as the others. The muzzles should be worn as a means of identity. It should be sufficiently displayed on the dog's head as to serve as a token.

(*To be continued.*)

TREATMENT OF SKIN DISEASES WITH STEAM.—It has been demonstrated that the application of a jet of "cooled" steam to parts affected with chronic eczema and other eruptive skin diseases, for a period of 15 to 30 minutes per day, will bring about a healthy condition of the skin. This would be well worth trying in cases of greasy heels.

CONTAGIOUS DISEASES ANIMALS ACT, 1894 and 1896.

SUMMARY OF RETURNS OF OUTBREAKS, for the four weeks ending June 19th, 1897.

ENGLAND AND WALES.

Pleuro-Pneumonia.	Swine Fever.	Glanders. (including Farcy).	Rabies.	Anthrax.	Foot and Mouth
Outbreaks Confirmed 3 Cattle found diseased 25 Slaughtered 176	Outbreaks 195 Slaughtered 3,505	Outbreaks 67 Attacked 114	Dogs 10 Other Animals None Destroyed 1	Outbreaks 16 Attacked 33	None

SCOTLAND.

None	Outbreaks 2 Slaughtered 107	Outbreaks 4 Attacked 14	None	Outbreaks 6 Attacked 9	None

IRELAND (for the four weeks ending 12th June).

None	Outbreaks 41 Slaughtered 585	Outbreaks None Attacked 1	Dogs 54 Other Animals 14 Destroyed 43	None	None

EFFECT OF A LEE-METFORD BULLET.—At Aldershot, on Tuesday, 8th June, the charger of the militia colonel, while being exercised by a groom, slipped and fell, bringing the groom to earth, and injuring him. The charger's leg was broken, and a veterinary being sent for, it was ordered to be shot. This was done with a Lee-Metford bullet at ten paces range. The animal was shot right in the centre of the forehead, the bullet, according to the statement of a militia officer, passing clean through its body. The curious effect of the Lee-Metford, which is now being supplied to the British army, was that, although shot through the brain, the charger stood bolt upright for at least five minutes, then reared straight up in the air, and fell backwards downhill, but life did not become extinct for several minutes even after that.

THE ANTITOXIN TREATMENT OF RINDERPEST.

WE are glad to see that the Basutoland Government have not dropped the subject of the experimental investigation and antitoxin treatment of the rinderpest. Although Professor Koch and Dr. Eddington have not, according to all accounts, completely solved the problem of the prophylactic and curative treatment of the disease, yet their work has been of such a nature that it holds out some prospect of being profitably followed up. Hence the decision of the Basutoland authorities to offer a salary of £350, together with all expenses, for a suitably qualified veterinary surgeon to proceed to the Cape and to carry on the inoculation experiments is a step in the right direction. Professor Koch having carried the question so far, further research may be carried out by a less distinguished operator. Failing authoritative information—for the officials at the Crown Office for the Colonies know nothing of the matter—we must conclude that this is the meaning of the advertisement which appeared recently asking for a suitably qualified man to undertake the experimental investigation of the inoculation against the disease by Koch's method.—*The British Medical Journal.*

Legal News.

THE "DOCKING" OF HORSES.

IMPORTANT TEST CASE AT HALIFAX.

A CASE which has aroused considerable interest among the veterinary profession throughout the country again came before the Halifax Borough Magistrates yesterday. It was a charge of cruelty against John Appleyard, veterinary surgeon, and Ratcliffe Ingham, farmer, Wheatley, Halifax, the alleged offence consisting in the docking of a horse's tail. On the previous occasions that the case was mentioned in court no evidence was given, but yesterday the charge was fully gone into, the hearing lasting six hours. The justices on the bench were Mr. T. S. Scarborough, Mr. J. Whitaker, Mr. J. Shoesmith, Mr. W. Barstow, and Mr. J. Shillito. Mr. Waugh and Mr. Colam were counsel for the prosecution, and the defendants were represented by Mr. McKeand, of Manchester. The summonses were taken out by Inspector R. Rigg, the local officer of the Royal Society for the Prevention of Cruelty to Animals.

Mr. Waugh, in opening the case, explained that the defendant Ingham was the owner of the colt, which was rising three years old, and that, at his request, Mr. Appleyard performed the operation of docking upon the animal at a stable in Halifax on February 14. A large quantity of blood came from the tail. A hot iron was obtained, and an attempt was made to staunch the bleeding, but when the animal was subsequently being walked through the streets of Halifax the tail still bled. The animal, which was turned out to grass, was seen on the 17th of February by one of the inspectors of the Society. At that time the animal was suffering great pain, there being much tenderness about the tail. Both defendants were afterwards seen. Ingham, who paid 2s. 6d. for the operation, said he had had the tail docked, because he was told it would strengthen the back parts of the horse. Appleyard stated that he did it to improve the animal's appearance. The operation, he further explained, was done in two seconds, and he denied that it resulted in causing the animal any pain. The suggestion that the dock was less susceptible to pain than any part of the body of the horse was, according to professional

evidence which would be called before the Court, absolutely ridiculous. It was just as susceptible to pain, if they cut it, as any other part of the animal, and the healing process was also painful. The tail was a protection to a horse against insects, and, in addition to that, it was a protection provided by Nature for the purpose of whisking off flies, or anything else, that might settle on its hind-quarters. In the fore parts of an animal the skin was provided with muscles which contracted, and by that means it got rid of any substances that might come upon the surface of the skin. That, however, was not the case so far as the hind-quarters were concerned. He did not think the Bench would have any difficulty whatever in coming to the conclusion that a painful operation was performed upon the colt in question. Therefore, it would be for the defendants to show that they had reasonable ground for performing the operation. If they could not then they would be guilty within the section under which they were charged. Mr. Waugh then quoted the case of Ford *v.* Wiley (L. R., 23, Q. B. D.), calling special attention to the following paragraph in Mr. Justice Hawkins' judgment:—"Docking is another painful operation, which, no doubt, may occasionally be justified, but I hold a very strong opinion against allowing fashion or the claim of the individual, or any number of individuals, to afford a justification for such a painful mutation and disfiguration." The real reason why docking was performed was stated by the defendant Appleyard to the Society's officer, and that was to improve the appearance of an animal. An animal which carried its tail well was more likely to be successful, either in the show-yard or at an auction sale, than an animal which did not. All animals did not hold their tails well. By the operation of docking, a certain portion of weight was relieved, and the result was that the tail was carried at an improved angle. He pointed out that race and cart horses were not docked. No horse would be purchased by the Government that had had its tail docked. To say, therefore, that docking was performed for a beneficial purpose was a mere quibble. This case was an important one to the veterinary profession, and he asked the Bench to say that docking was an operation which could not be recognised.

The first witness was T. S. Beverley, blacksmith, Mount Pellon, on whose premises the docking took place. In cross-examination, he said the operation was performed skilfully and properly.—Police-constable Gregson gave evidence as to seeing Ingham leading the horse after the operation. The animal, he said, was trembling very much, and its tail, as well as the hind-quarters, was covered with blood. He did not, however, think that it was his duty to stop the animal.—Inspector Brown, of Huddersfield, and Inspector Rigg, of Halifax, were the next witnesses. The Halifax officer was examined as to an interview with Appleyard. The defendant remarked, "I did it in a second, and it did not suffer at all." Witness then said, "Do I understand you to mean that it did not suffer during the operation, and won't suffer during the healing process?" To this the defendant answered, "Most decidedly, it cannot be called suffering." He (the witness) afterwards saw the horse, and its tail was then slightly suppurating.—Cross-examined, the witness said that about two-thirds of the horses in Halifax were docked.

Harold Leeney, M.R.C.V.S., London, said he considered that docking was a painful and unnecessary operation, though, in cross-examination, he admitted that he had possibly docked 300 or 400 horses.

Mr. McKeand: Why did you do it? Through my poverty and not my will. —Then you sacrificed your feelings for the sake of your pocket? Yes, I was obliged to do it. I think fashion is the principal cause of docking.—A. V. Wren, M.R.C.V.S., of Bury, thought it would have been impossible to perform the operation described without causing the animal pain.—In cross-examination, he acknowledged that he, too, had docked many horses, though

it had struck him that the operation was a cruel one. A veterinary surgeon was obliged to please his clients or they would go somewhere else.

Professor William Pritchard, ex-president of the Royal College of Veterinary Surgeons, and at present a member of the Council of the College, said that docking unquestionably caused pain. The wound caused by cauterisation sometimes took three months to heal, and pain was caused during the whole of that time. Assuming that it was necessary to remove a horse's tail owing to some malformation, he would not cauterise the wound afterwards. He would use other means well known to the veterinary profession, to stop the bleeding. He did not believe that a horse was rendered more valuable by reason of the fact that it was docked, for the most valuable harness horses in the world—the American trotting horses—were not docked.—Mr. Waugh: Is an animal that has been docked any stronger in the back? The Witness: No, it is ridiculous.—Cross-examined: He had come to the conclusion that docking was cruel the first time he saw the operation performed. He had docked many horses in his time, and had adopted the same process as Mr. Appleyard. He had not docked horses recently, and had lost many customers thereby.

For the defence, Mr. McKeand submitted that what the Act of Parliament contemplated was wanton and unnecessary cruelty, and not the act of docking. Probably more than three-fourths of the horses of this country in general use were docked. It came, therefore, as a shock to the veterinary profession, whom he indirectly represented, that suddenly a prosecution should be commenced which practically meant that for the future, if a conviction followed, docking should not be allowed. Every operation must, of necessity, give pain, and docking undoubtedly caused pain. So, however, did firing and blistering horses. Yet those acts had never been objected to as an extremely painful operation. It was not suggested that, in the carrying out of the docking, the defendant Appleyard performed it in other than a skilful manner. The veterinary profession were generally agreed that docking was absolutely necessary. They were of this opinion, not because it made animals more saleable, but because long tails were highly dangerous in driving to the person driving, to the public generally, and to the animal itself. The case quoted by Mr. Waugh did not apply here, as it referred to the dishorning of cattle. In conclusion, he urged that docking was a necessary operation, that it was no breach of the law of this country to dock, and that it did not cause more pain than was absolutely necessary.

Professor Williams, Principal of the New Veterinary College, Edinburgh, said that docking was necessary alike in the interests of the public and the horses to be used in harness. He considered searing was a proper method to stop the bleeding, and he had never seen any bad results from searing.—Cross-examined, Mr. Williams said the actual cautery was now applied in certain surgery cases as being the safest way of arresting bleeding. Antiseptics were used as well. The docking of a horse caused simply momentary pain. It was true that on August 7th, 1884, he answered a question that docking was carried on to a degree that was excessive, and should be discontinued, but what he had in his mind at the time was the operations performed by unqualified men.

Mr. Tom Mitchell, spinner and manufacturer, Bradford, and a large breeder of hackneys, spoke in favour of docking, and said the operation in this case was done skilfully and humanely.

Professor Axe, an ex-president of the Royal College of Veterinary Surgeons, also considered docking necessary, for the reasons advanced by Professor Williams and Mr. Mitchell. He added that the freedom from accidents in this country was due to the fact that 90 per cent. of the horses were docked. He approved of the process adopted by Mr. Appleyard.

Other technical evidence was given by Messrs. J. A. W. Dollar, New Bond Street, London; William Woods, an examiner of the Royal College of Veterinary Surgeons; Lawrence Butters, Liverpool; Tedbar Hopkin, Salford: W. A. Taylor, S, Locke, Manchester; Henry Howes, Lincoln; Joseph McKinder, Peterborough; Mr. G. E. Bowman, Leeds (all of whom are veterinary surgeons); Mr. Robert Whitworth, Halifax; Colonel Thwaites, Harrogate (breeders of hackneys); and Joseph Welsh, jobmaster, Manchester. These witnesses expressed agreement with what had been put forward on behalf of the defence.

The Bench consulted in private for fifty minutes. On their return into Court the Chairman announced that they had decided to dismiss the case.—In reply to Mr. Waugh, the Chairman said they were quite prepared to state a case, if desired.—*Yorkshire Post*, Tuesday, June 1st.

Notes and News.

OVER FIVE THOUSAND CATTLE CONDEMNED FOR TUBERCULOSIS.—The Cattle Commission of Massachusetts has made its report for the year 1896. A large showing of work is made as to the quarantining of animals regarded as infectious and suspicious, the examinations of animals coming from without the State to the cattle markets without certificates and upon special permits, examination of stables with a view to their sanitary improvement, and laboratory and stable experiments to determine various problems connected with the work of the Board. A table is given showing the number of animals quarantined in each city and town, the number condemned, and the amounts paid. There are 550 animals which have been condemned, amounting in value to 16,040 dollars; and the warrants for killing are in process of settlement. The totals of this table are: Meat cattle assessed in the towns, 212,601; number tested, 8,969; number condemned, 4,694; amount awarded, 153,733 dollars. Thirteen towns made no returns as to herd inspections. During the year the Board has had 30,000 dollars at its disposal. It has paid for 5,198 head of cattle, condemned as tuberculous, the sum of 173,206 dollars. There has been paid for quarantine expense, 28,223 dollars, making a total of 217,470 dollars returned to cattle owners.—*Journal of the American Medical Association.*

INSPECTION OF MEAT.—The report of the late Royal Commission on Tuberculosis showed the great necessity that exists for the adoption of proper administrative methods designed to prevent the sale of meat from tuberculous animals, or of meat from healthy animals that has become infected by the slaughterers from diseased carcases in the processes of dressing. The existing Royal Commission is to report on those administrative methods which are practicable in this country, and is so much impressed with the general concurrence amongst the witnesses who have been heard as to the necessity of establishing public abattoirs wherever this is possible, both in the interests of the public health, and to protect graziers and butchers against the present want of uniformity in the seizure of carcases on account of tuberculosis, that several of its members, with its Honorary Secretary, Dr. Legge, have commenced a tour of inspection of foreign cities to study this question. The first cities to be visited are Brussels, Cologne, Berlin, and Leipzig, where the municipal abattoir system has reached a high stage of development. It may be anticipated then that the recommendations of the Royal Commission will include the establishment of public abattoirs in all municipal centres, the

regular and systematic inspection of all beasts intended for slaughtering, and of all carcases during the processes of dressing, and the adoption of some plan for the gradual abolition of private slaughter-houses. The Council of the Sanitary Institute has for long recognised that a course of instruction in meat inspection formed a most essential part of the technical education of sanitary inspectors, to whom large powers of condemnation are entrusted by the existing Public Health Acts, and to whom will be relegated in many instances those larger duties in connection with public abattoirs which are likely to be a feature of the municipal methods of the near future. The Council, therefore, in the spring of 1896, organized, in connection with the sanitary officers' lectures, special demonstrations, held at the Institute, for the inspection of meat. The students also were taken, under competent guidance, to one of the London meat markets, to see the methods of preparing meat for sale; and demonstrations were given as to the appearances and physical characteristics of healthy meat, and where to look for, and how to recognise, abnormal appearances indicating disease and unsoundness. The demonstrations given in the museum of the Institute were rendered possible by the kindness of medical officers of health in various parts of the country, in sending up carcases and portions of animals affected by various diseases. These specimens were carefully explained to the students by the lecturer, and the students were afforded the opportunity of handling and closely examining the various tissues, both before and after the demonstration. The following are some of the diseases which have been illustrated:—Cysticerci, trichinæ, hydatid cysts of lungs and liver, flukes, tuberculosis of lung, pleura, udders and lymphatic glands, swine fever, septicæmia, milk fever, inflammatory womb of cow, pericarditis, fibroid tumour, joint-ill, joint-felon, broncho-pneumonia, ankylosis, and slink meat. The numbers of students attending the demonstrations at the meat market in the three sessions were 77, and at the museum 233. Many of the specimens have been preserved for permanent exhibition in the museum by immersing them (1) for 24 hours in formalin, (2) for 12 hours in 80 per cent. alcohol, (3) for 2 hours in 95 per cent. alcohol, and finally bottling them in a solution of equal parts of water and glycerine. This process has been found advantageous for fixing the colour of the specimens, and for preserving their normal appearances. For the better preservation of the carcases sent to the museum for demonstration, a large cold storage chamber, with well packed double walls, has been specially constructed in the basement. By means of ice, specimens may be preserved in this chamber for several days, even in warm weather. Convenient tables for dressing and examining the carcases have been provided.—*British Medical Journal.*

HYDROCHLORATE OF HOLOCAINE.—Loewenstamm (*Therap. Monats.*, May, 1897) relates some further investigations into the use of holocaine in one per cent. watery solutions in ophthalmic practice. It cannot be employed subcutaneously because its toxic action is considerably greater than cocaine, and even in ophthalmic work it should be used in minimum doses. By applying a few drops anæsthesia is produced in the eye in about ten minutes. The author has employed holocaine in 16 cases, of which 7 were normal eyes, 5 were examples of foreign bodies, and 4 were operation cases. In one set of 3 cases 4 drops were put into the eye, and repeated in 5 minutes, when the anæsthesia of the cornea and conjunctiva lasted on an average 19 minutes. In 6 other cases the same quantity was used on 3 occasions at intervals of 5 minutes, and the anæsthesia lasted on an average 30 minutes. A slight touch was felt before the lid reflex returned. In 3 cases 4 drops were applied on 3 occasions at intervals of 2 minutes, and here the anæsthesia lasted on an average 26 minutes. This method has the advantage of requiring only a short time before the operation can be commenced. Often an increase in the anæsthesia of the conjunctiva was noted after the second and third application,

and where this did not occur a passing sensation of burning was experienced. The removal of the foreign body was accomplished in one eye 8 minutes, and in the other 15 minutes after the second application, without the patient feeling anything. In 2 operations for squint lasting 15 to 20 minutes 2 applications sufficed. As regards gradual action no difference was noted from cocaine, but the tension of the bulb was not lessened, the cornea retained its lustre and moistness, and the pupil was not dilated. No toxic effect was noticed, and no change in the pulse or urine. Heinz allowed a 5 per cent. solution, and also the dry powder to be applied to his own eye, and no intoxication symptoms occurred. Perhaps holocaine is less readily absorbed from the conjunctiva than cocaine. Thus holocaine is a prompt, pronounced, and long-lasting anæsthetic with no unpleasant results. It should find a permanent place in ophthalmic practice. Boiling the solution is not requisite, as holocaine possesses powerful disinfectant properties.

Foot and Mouth Disease.—Bussenius and Siegel (*Deut. med. Woch.*, February 4th, 1897) record their investigations into the common cause of this disease in man and animals. Most researches have centred round the streptococcus as the cause of the disease, but feeding animals with the streptococcus does not produce the disease. The authors relate their investigations in cases of slight mouth disease ("Mundseuche") in children. In three cases pure cultures of an ovoid bacillus (Siegel's B.) were eventually obtained from the saliva. The saliva was administered by the mouth to a dog, cat, sheep, two hens, and a calf. Only the hens and calf became ill. The hens suffered from diarrhœa, with hæmorrhage. Cultures of the ovoid bacillus were obtained from the blood as from the saliva. The calf developed foot and mouth disease, and the same micro-organism was recovered from the blood. Thus the transference of the disease from man to an animal was effected. The authors record an investigation into an epidemic in a dairy farm. Saliva was taken from three animals, and milk, fæces, blood, and urine from one of them. From the blood small bluish-white colonies developed, consisting of the above-named ovoid bacillus. Bouillon is especially adapted for its growth. The bacillus was not obtained from the milk, fæces, or urine. At a later period, when ulcers had formed, further investigations were made and the same bacillus found. In the case of a ten days' old calf the bacillus was obtained from the blood, spleen, kidney, and liver. Another calf placed in the same stall licked the diseased parts of the first calf, and developed the disease. The results of the bacteriological examination was the same in this as in the former case. The authors refer to another investigation, but here all the animals except one had practically recovered. The bacteriological examination was negative, as the material had been obtained too late. In another epidemic the nasal discharge still persisted, and the cultivation experiments gave positive results as regards the blood and saliva, but negative as regards the secretion from the ulcers. Experiments were made upon calves, 10 c.cm. of a bouillon culture of the ovoid bacillus being given to one calf, and 1 c.cm. to another. Both developed the disease. A pig was also fed with a culture, and developed the symptoms of foot and mouth disease. The ovoid bacillus was found here in the blood from the heart. The authors produced the disease in guinea-pigs by the use of saliva, blood, or fresh cultures, but not with old cultures, where the micro-organisms had become less virulent. The guinea-pigs died with symptoms of blood poisoning, and cultures from the blood showed the ovoid bacillus. The above goes to show that the cause of the disease in man and animals is the same.

My recent experiences convince me that gall of a dark green colour, clear, without smell, and which when shaken gives a white froth with greenish tinge, never gives rinderpest, but confers immunity, and only such galls must be used for the purpose. Even these should be examined microscopically

and bacteriologically to prove them free from septic organisms. I repeat that gall in sterilised air-tight bottles will preserve its power on ice for the space of at least fourteen days. This has been tested. Therefore the gall is a practically useful immunising agent. In fact, gall properly chosen and used with all scientific precautions cannot produce the disease.—*Dr. Kohlstock on Rinderpest in South Africa.*

SERIOUS CASES OF CATTLE POISONING NEAR FORRES.—Considerable excitement has prevailed amongst the farmers and crofters in the Califer Hill and Rafford districts during the past three weeks in consequence of a number of cows being suddenly seized with illness whilst grazing. Some three weeks ago Mr. William Sutherland, crofter, Califer Hill, lost a fine cow, and a week later James Mackenzie, also a crofter on Califer Hill, lost a valuable cow. Mr. J. G. Tait, V.S., Forres, made a *post-mortem* examination on the cows, and found a considerable quantity of white lead in their stomachs. Some days ago the matter was reported to the police at Forres, and since then Deputy-Constable Bruce and Constable F. Grant, Forres, have been indefatigable in their investigations in order to discover the perpetrator, as there was no doubt the poisonous material had been placed in the fields by some evil-disposed person. Early on Tuesday morning Mr. Bruce and Constable Christie, Burghead, paid a visit to the house of William Reid, who at one time occupied a croft on the Califer Hill, but who is now residing in Burghead. Not finding Reid at home, they afterwards visited the Califer Hill, where they found and apprehended Reid in a grass field on the croft of Mr. James Mackenzie, and had him at once conveyed to Elgin on a charge of laying down the white lead on the crofts mentioned. Reid was examined before the Sheriff, and afterwards committed to prison for further examination. The farmers and crofters have been feeding their cattle under cover, so great has been their alarm during the past two weeks. White lead has been known to do its deadly work amongst cattle for many years after being on the surface of the ground, so that the fear of those referred to is quite justified.

WOOL-SORTERS' DISEASE.—An inquest relative to the death of a wool-sorters' labourer, named Watson, was held at Shipley recently. Dr. Rutherford described the result of a *post-mortem* examination which he made after the inquest. He stated that, on microscopic examination of the fluids removed from the brain and chest, they were found to be crowded with bacillus anthracis, which was the essential cause of death. In other words, death was due to what was commonly known as "wool-sorters' disease." A witness, Hartley, foreman wool-sorter at Saltaire Mills, was recalled, and described in detail the different kinds of work upon which the deceased had been engaged. It transpired that a few bales of raw mohair had been opened in the warehouse for inspection, and Mr. Beaumont suggested that in future this should be done in a separate place, boarded off, with a down-draught so that none of the dust could rise. The jury returned a verdict to the effect that deceased had died from "wool-sorters' disease," which he had contracted whilst following his employment at Saltaire Mills. A rider was added recommending that the floors of the warehouses where dangerous wools are stored should be thoroughly sprinkled daily with a disinfectant solution.

TUBERCULOSIS AS AFFECTING THE MILK SUPPLY.—The medical officer of health, Liverpool, has recently submitted to the Health Committee an exhaustive report on "Tuberculosis as affecting the Milk Supply of the City." After describing the conditions which are recognised as the causes of tuberculosis. it is pointed out that the effect of improved sanitation in Liverpool has been to produce a notable decrease in the death-rate from this cause. Thus the annual average death-rate per 100,000 of the population from all

forms of tuberculosis in the decade 1866-1875 was 430·8, while in the year 1896 it was only 292·5. Investigations into the conditions of the milk supplied to the city were made by Professors Boyce, Delépine, Hamilton, and Woodhead. A total of 168 samples were taken from different sources so as to fairly represent the city supply. The examinations were made, both by means of the microscope and by the method of inoculation, but for obvious reasons the results arrived at by the latter method were much more valuable. The conclusions drawn as to the infective properties of the milk are on the whole fairly satisfactory, though indicating the need for further vigilance on the part of the authorities. Contrary to what might have been anticipated, the samples of milk derived from sources within the city were much freer from the germs of tuberculosis than those obtained from the country supply. Thus, out of 122 samples of city milk, only 2·8 per cent. gave evidence of infection, while of 24 specimens obtained at the railway stations 29·1 per cent. were capable of producing the disease. The comparative freedom of the milk obtained from town cows is no doubt due to the excellent supervision exercised by the health authorities over the dairies and shippons within their jurisdiction. The report points out that the risk of infection from drinking the milk of tuberculous cows can be entirely avoided by boiling it for a few seconds, and that the common prejudice against this proceeding is entirely groundless Dr. Hope concludes his report by stating that there is need for additional powers to prevent the erection of town shippons without adequate yard space, and without adequate open spaces around them. Also that more direct powers are required to enable the compulsory removal of diseased animals from shippons, and that measures are called for to prevent the importation into cities of the diseased products of insanitary country shippons.

AGRICULTURISTS AND THE BUTCHERS' CO-OPERATIVE BOYCOTT.—A meeting of agriculturists was held under the auspices of the Scottish Chamber of Agriculture, in the hall of the Highland and Agricultural Society, Melbourne Place, Edinburgh, on June 23, to consider the question of the butchers' boycott of the co-operators. The chair was occupied by Mr. George Prentice, Strathore, chairman of the Scottish Chamber of Agriculture, and there was an attendance of about ninety or a hundred gentlemen.—The Chairman, in opening the proceedings, explained the object of the meeting, and said he felt certain that none present would consider that the salesmen had done right in giving in to the demands of the butchers in regard to the sale of farm stock. They, as consigners, naturally felt aggrieved that anyone should give orders about their stock but themselves, and they would agree with him, further, in thinking that if any pressure had been put upon salesmen in that matter they ought to have consulted their consigners before taking any definite action. The directors of the Chamber of Agriculture took into consideration all matters affecting agriculture in any way, and seeing that the action of the salesmen touched every producer of fat stock they had given the question their attention, and had resolved to put the matter clearly before the salesmen and clearly before the public by calling a public meeting on the subject in order to allow a decided expression of opinion to go forth. He deprecated any discussion of the question between the butchers and the co-operators. That was no business of the farmers. The butchers might be left to manage their business as they pleased; their object, as farmers, was to prevent the butchers interfering with their interests. He hoped the meeting would have an outcome, and that they, as agriculturists, would show their hand decidedly, and would let their agents see what they desired them to do with their (the consigners') stock in open sale.—Mr. Peter Fyshe, Newtonlees, Dunbar, moved as follows:—"This meeting of Scottish agriculturists strongly deprecates the action of the auctioneers and salesmen in yielding to the dictation of the Butchers' Association, and refusing bids from *bonâ-fide* customers,

and resolves to oppose that action as an unwarrantable interference with the liberty of the subject, a contravention of the Free-trade principles of this country, and calculated to seriously and prejudicially affect the interests of agriculturists." Since, he said, this question had been raised before the directors of the Scottish Chamber of Agriculture, a great deal of correspondence had appeared in the newspapers. He had come in for some criticism. It was insinuated that he was entirely in favour of co-operators and co-operation. On the contrary, he had no sympathy with co-operators. Never had he anything to do with a co-operative society or store. He stood upon neutral ground, and upon that ground he was still inclined to stand. He simply advocated freedom of the subject and free sale. They, agriculturists, competed with the whole world. Prices were run down to them to the lowest extremity. The wonder, in fact, was how they now lived at all. Compared with the competition they had to contend with, the butchers had nothing to say at all. He had it on good authority that the auctioneers were consulted by the Butchers' Association at least six weeks before this "exclusive dealing" came into force But had either the butchers or the auctioneers considered the consigners? The consigners' interests were put to one side. The butchers were quite entitled to make the best of their position, but the salesmen, he held, were responsible to the consigners, and before they refused *bona-fide* bids they should certainly have conferred with consignors, and the agricultural interests generally. He knew that both butchers and salesmen were sick of this movement. It would end itself; it did not require that meeting; it was an unholy alliance that could not stand. If this arrangement of the salesmen and the Traders' Defence Association were carried to its logical conclusion, what would happen when the stock sales came on in August? Plenty of farmers dealt with the Civil Service Supply Association; plenty dealt with stores in their neighbourhood. Instances had come to his knowledge where even a dairyman was refused grass because he dealt with a co-operative store. But what he was going to say was this, that if the matter were carried to its logical conclusion, then the bids of four-fifths of the farmers when they came to buy stock would be absolutely refused. Were they to allow that or not? No one could compel them to send stock to a sale. He was not to advocate another co-operative business—another boycotting business; but what he asked them to emphasise was this, that they demanded absolute free sale for their stock when it was sent into the auction ring. He regretted that just at this very Jubilee season they should have to seek to justify their action in the matter of free sale. At the end of the 19th century it was absolutely rotten that one section of the community should dictate to the farmers how they were to dispose of their stock. Farmers had hitherto been very disunited. They had never objected to either co-operative stores or butchers; they simply abode by the economic laws of supply and demand. They should stick to these laws, in order that everybody might have a fair field and no favour.—Mr. John Bruce, Langlee, Galashiels, seconded. It was he said, a constant cry that farmers should combine on this matter and force the hands of the salesmen; but it was not an easy thing for many thousands of farmers scattered throughout the country to combine in that way. There were many undercurrents at work which would break down any such combination were the salesmen to set their faces against it. There had been profitable selling at sales, but he could recall the time when they sold at home with equal benefit to themselves. There were plenty of good men willing to come and give good prices down for their stock. This "boycotting," as he called it, had done him no harm; but he thought they should adopt this motion, which would show the salesmen where they had gone wrong. The motion was put and adopted unanimously.—Mr. George Constable, Traquair, Galashiels, moved the following motion: "This meeting resolves to request auctioneers and salesmen, within fourteen days from this date, to rescind any

conditions of sale which entitle them to refuse bids from *bonâ-fide* customers, and instructs the secretary to convene another meeting of agriculturists in Glasgow during the Highland Society's show to receive and consider replies and take what further action may be deemed expedient." They all felt, he said, the rather high-handed treatment that the farmers had received from some of the salesmen, who had changed their conditions of sale without consulting or advising the consigners. At the same time they should take cognissance of, and pay due honour to, those salesmen who had not caved in to the butchers' demands, but had manfully stuck to their guns and had taken bids from anyone. The resolution was a reasonable one. It simply asked the salesmen to retract the obnoxious conditions they had adopted during the last few weeks, and empowered the secretary, Mr. Connell, S.S.C., to convene another meeting shortly. He did not wish to express any threat, but he could not think that the farmers of Scotland would stand idly by and have their hands firmly chained behind their backs by any salesman in Scotland. The farmers could quite well protect themselves, and they meant to protect themselves; but, at the same time, if they could manage to settle the thing fairly they were prepared to do so. But, in the other event, they were quite prepared to do something else.—Mr. Walter Gibson, Campton, Haddington, seconded the motion. He said that the farmers wished no favour, what they asked of the salesmen was in the interests of the consigners, who were the farmers of Scotland, and who now appealed to the salesmen as a matter of justice, not only to the consigners, but in the interest and convenience of the public generally.—Mr. John Speir, Newton, moved an amendment to this effect:—"Resolve to remit to the directors of the Chamber of Agriculture to watch progress, and to convene a meeting of agriculturists when considered necessary." He said he was assured from what he had heard that the butchers and salesmen were quite sick of the matter, and they might, in these circumstances, allow it to die a natural death. He felt certain that natural causes would bring it to an end, and, therefore, on the present occasion he thought they were a little bit "too previous." He would advise caution in the matter. What, for instance, did they mean to do in the event of a large section of the auctioneers refusing to agree to the request in the second motion? It simply meant that they would have to turn round and boycott the salesmen or the butchers. He was sorry to differ from the gentlemen who spoke, but, so far as he could see, there was no other way out of the difficulty. Notwithstanding the difference of opinion expressed, he repeated his view that supposing a large section of the salesmen treated their demand with contempt, or gave it a decided refusal, they would be driven back to this position, that they might in great part be compelled to abide by that refusal, or to take the course of backing up the co-operators. He was not inclined to say that they, as consigners, ought to take either one side or the other in the quarrel—their course was rather to be clear of both.—The Chairman said his opinion was that the farmers had waited long enough, and that they were quite right in asking the salesmen to rescind the objectionable condition. There was, however, another phase of the matter. It struck him that by the action they proposed they were helping their agents to resist an unwarrantable demand. There were two parties fighting the salesmen, and he rather thought that what they proposed to do by the motion was to help the weakest party of the three. He knew that the salesmen would be delighted to be forced by the farmers. They desired the help of the consigners to enable them to throw off the burden which was resting on their shoulders at the present time. Only that day he had heard that if the meeting passed the motions, some of the largest salesmen would call a meeting of their trade to endeavour to bring about cohesion for the purpose of breaking down the action of the

butchers.—Mr. James Reid, Kilmundy, Glamis, Forfarshire, supported the motion, and said that the butchers' movement was a piece of gross oppression altogether. They, as agriculturists, had already suffered, and he thought they had been already insulted as agriculturists. They ought assuredly to have been consulted before the auctioneers took the action that they had. In Forfarshire, he knew that that opinion had been very generally expressed. If the farmers would only stand together they could very soon rectify the matter. Mr. John Ballingal, Dunbog, Fifeshire, also spoke in support of the motion.—He held the view that the salesmen had been dealt with in that matter in an exceedingly mild manner. In his opinion, the auctioneers had made a shameful surrender to the butchers, to the sacrifice of their supporters, the consigners. Farmers had been too slow in allowing that boycotting business to go on for weeks and weeks. He could not agree that they should wait any longer; they ought to strike now, when the iron was hot. As a matter of course, the action of the butchers would end in well-merited and complete contempt. To imagine that the butchers were to revolutionise the entire trade of the country—for that was what their movement meant—was ridiculous in the extreme. Their action was remarkable both for its ignorance and its consummate impertinence. Farmers had good stock to sell, and they could sell it at home if necessary. And they could quite well do with a little less of the salesmen than they had been accustomed to in the past.—Mr. John Amer, Cramond Bridge, supported the motion, remarking that the sooner this affair was brought to an end the better.—Mr. John Gordon, Coulisse, Ross-shire, seconded the amendment.—Mr. Cunningham, Dallachy, in supporting the motion, said they were met to let the live-stock salesmen know that they had done a rash and an unwarrantable thing.—Mr. Scott Dudgeon, as well as another gentleman later on, appealed to Mr. Speir to withdraw his amendment. After some further conversation, the motion was adopted, the amendment receiving only two votes. It was afterwards resolved that copies of the resolutions be sent to the salesmen, the agents of the Butchers' Association, and the secretaries of agricultural societies. The proceedings, which had lasted about an hour, terminated with the award of a vote of thanks to the chairman.—*Scotsman*, June 24th.

Extracts from Foreign Journals.

TETANUS IN THE HORSE.

Dr. Albrecht reports a case of a horse which was brought to him for examination. It had refused all food for four days before coming to him, and saliva was dropping from its mouth. He recognised at once all the symptoms of generalised tetanus. From the beginning the masseters had been very contracted, whilst the contraction of the muscles of the other regions showed itself only towards the fifth day. The animal presented no trace of injury on the surface of the body, but on examination of the mouth the marks of two burns were found which had been made seven days before by a quack at the request of the owner, because the animal had lost its appetite and was suspected of lampas. The wounds were cauterised, and the patient received every day washes of hydrate of chloral and others composed of milk and eggs with the addition of sulphate of soda. This went on for 17 days, after which the owner insisted upon the animal being killed. Dr. Albrecht, considering that the first symptoms of tetanus had shown themselves in the region of the head, and, not finding any wound elsewhere, concluded that the bacillus of Nicolaier had penetrated into the organism by the wounds in the palate.

On the 10th of April last year another horse was brought to Dr. Albrecht, which, four days previously, had undergone the same operation. The disease began with violent trismus, which next day was followed by contraction of the muscles of the trunk. The animal succumbed on the third day. In this case, as in the former, Dr. Albrecht takes it for granted that the wounds in the palate had acted as an entrance for the germ of the disease. On the other hand, he remarks that he knows many places where this operation is practised very frequently, even on young horses cutting their teeth, and yet he has not observed any case of tetanus following thereupon. He adds that the rarity is quite surprising in stables where animals live whose mouths have been thus mutilated, seeing that the microbe supports itself easily, multiplies in stables, and especially in those in which dusty hay is used. It is possible that the horses in such cases may be protected by the fact that the fodder does not remain long in the mouth, and that the salivary secretions neutralise the action of the microbes, or, perhaps, these latter do not find in the fodder the companionship of the other microbes necessary for the development of their destructive action.

On account of the troubles always presented by the puncture of the palate, veterinary surgeons ought to employ every possible means of preventing shoeing smiths and quacks from performing this barbarous operation, which makes it impossible for a horse to feed properly for days together, mutilates the palatal arteries, and may even bring about fatalities as above described.—*Wochenschr. für Thierheilkunde.*

TREATMENT OF TETANUS WITH LYSOL.

Veterinary-Surgeon Härthe reports a case of the cure of tetanus following on a prick with a nail, which he treated with lysol. The shoe having been removed as soon as the first tetanic symptoms appeared, the hole made by the nail was cleaned out and thoroughly cauterised with nitrate of silver. There was administered to the patient by the mouth a litre and a half of solution of lysol, with the greatest precautions, also several washes daily with the same solution. In addition, a ten per cent. hypodermic injection of the same substance was made on the sides of the neck. Three days afterwards the horse was cured and nothing further was noticed for several days thereafter but a slight tendency to excitability. The subcutaneous injection was followed by a tumour of considerable size which disappeared, without abscess, in a week or two. The question may be asked whether the cure is to be attributed to the cauterisation of the wound or to the action of the lysol, the effects of which are not yet well enough known in the treatment of tetanus to allow us to pronounce a decided opinion.—*Wochenschr. für Thierheilkunde.*

A CASE OF TETANUS, TREATED WITH TETANUS ANTITOXIN.

On the 29th December, 1896, I was summoned to Neckarau, and found a grey mare about nine years old, a middling-sized animal, suffering from tetanus. The whole of the muscles of the body were already rigid with the cramp, so that general rigidity was quite visible. Trismus alone was incomplete; I could still put three fingers between the incisors. Sharp prominence of the membrana nictitans. The temperature stood at 38°8 Centrigrade, and the pulse was 48 beats; rhoncus in the trachea, short, painful cough. Appetite still existent; the saliva was not completely swallowed, it flowed in

strings out of the mouth. Respiration was accompanied with violent heaving of the abdominal muscles. I told the owner, a cottager in poor circumstances, of the new successful treatment of tetanus patients with tetanus-antitoxin. The mention of the price elicited a little exclamation of surprise from him; however, after a long discussion, he agreed to my proposal. The antitoxin I had ready to hand at home, so on the next morning, December 30th, at about 11 o'clock, I was able to perform the injection. It was done in the prescribed way, intravenously in the left jugular. The patient stood like a trestle, all the muscles hard as board; trismus had developed farther. I could no longer put even my little finger between the incisors. Eating was impossible. The animal took hay greedily, but kept the stalks in its mouth. Saliva could not be swallowed. On the fingers being introduced into its mouth, a great deal of saliva was discharged. Pulse 40, temperature 38°5, respiration 42.

To make the injection, the patient had to be turned a little towards the light. This was only done with difficulty, as the animal threatened to fall down. I further ordered copious rinsing of the mouth. On the 31st December I saw the patient in the course of the afternoon. The lumbar muscles seemed to me softer; ability to swallow was really much greater. There was no longer any outflow of saliva. Pulse 40, temperature 38°7, respiration 40. On the 2nd January I saw the animal eating inside the stable. The trestle-like appearance had vanished, the legs again stood straight. The lumbar muscles were softer. The neck could be bent at will. The membrana nictitans still projected on raising the head. The ears still stood up quite stiff. The cough had become more frequent. Appetite very good. The animal could bite off pieces from a whole beet. On the larynx being compressed the animal showed signs of pain. On the 5th of January, all the signs of cramp had still further diminished. The animal walked left and right at will. Movement was existent in the ears. The membrana nictitans was no longer visible on raising the head. On the 9th January the signs of cramp were almost quite gone, action still seemed pretty stiff, and the legs were raised and set down with visible caution. The pain in the larynx was still there, so was the irritation from the cough. In my opinion, the animal before being seized with tetanus had suffered from inflammation of the larynx, and I am inclined to regard this spot as the starting point of the tetanus-poisoning.—*Vet.-Surgeon Ulm in the Deutsche Thierärztliche Wochenschrift.*

POISONING THROUGH ARTIFICIAL MANURE.

Three cows of six to eight years old and eleven sheep were put into a meadow that had just been strewn with artificial manure. The animals greedily devoured the manure with the grass, and even sought out the spots in which the manure was gathered together in small heaps. In the course of the day no bad symptoms were noticed; on the following day, however, among both cows and sheep a plentiful black-brown diarrhœa set in, which lasted the whole day, and was accompanied by symptoms of colic; at the same time appetite and rumination ceased. These symptoms lasted three days with two cows and the eleven sheep, and then gradually subsided, while with the third cow the general condition was growing worse and worse. The latter lay on her right side, unable to rise; the muzzle was dry and warm, the tongue foul. The patient groaned, looked round at her abdomen, and made ineffectual efforts to stand up; diarrhœa continued; there was both flatulence and colic. This state of things grew worse from hour to hour; the patient was very low, groaned, had grinding of the teeth and severe colic. Mucilaginous drinks mixed with oil of turpentine were administered, and injections

made by enema. On the following day the prostration and flatulence increased, breathing was laboured and uneasy; the pulse was small and slow; the patient died during the night.

On *post-mortem* examination, no lesions were visible in the mouth, larynx, or pharynx. All four stomachs, especially, however, the paunch and the third stomach, were filled with black, dry bits of fodder. The mucous membrane of the stomach was also black and dried up, could be taken off in scales by the fingers, and then showed that the submucous cellular tissue was likewise dried up and coloured black. The intestine, which held only a few bits of fodder, was strongly injected; its mucous membrane showed bloody infiltrations and hemorrhagic points; everywhere traces of the black diarrhœa were noticed. The other organs were quite sound. The symptoms existent during illness, the time of their appearance in all the animals at once, and the character of the lesions exhibited on dissection seem to bear out the diagnosis, "Poisoning due to eating artificial manure." The latter, composed of slag-phosphate, was found, on analysis being made, to contain 75 per cent. of phosphoric acid, and was strewn in a quantity of 2,500 kg. (say 50 cwt.) over the six-acre meadow. This manure, which, according to the statement of the owner, had in some places burnt holes in the sacks, penetrated in the form of dust the nostrils and gullet without doing any harm, and it was only after the acid it contained had been released by digestion and assimilation had taken place, that it wrought such havoc.—*Revue Vétérinaire.*

Correspondence.

RETENTION OF THE FŒTAL MEMBRANES.

To the Editor of THE VETERINARY JOURNAL.

SIR,—Allow me to endorse the remarks made by a country practitioner in the June number of the VETERINARY JOURNAL with respect to the infrequency of any serious complications from retention of the "cleansing" in cows. I believe that the statement is now often made that this condition is one of the commonest causes of puerperal septicœmia in cattle, indeed, a veterinary surgeon has recently so stated in court. I can only say that this is quite contrary to my experience. I do not deny that endometritis (superficial inflammation affecting the mucous membrane of the uterus) sometimes ensues, but this is quite a different affection from the dreaded puerperal septicœmia, in which all the structures of the uterus are involved, and there is extension to the peritoneum and general blood-poisoning. This latter condition is indeed often induced by the too hasty and injudicious removal of the membranes, but their retention even for weeks, and until they are putrid, is seldom followed in cows by anything more serious than some loss of condition, of appetite and of milk. I have often removed the membranes, or at least part of them, for I will defy anyone to get them clean away by hand, and for the most part successfully. I can, however, instance one occasion where my interference was followed by fatal results, and I was blamed for killing the cow, and this in spite of the fact that antiseptic precautions were taken in the shape of uterine douches, etc.

It is well, therefore, that young practitioners should be warned against running counter to the prejudices of cowkeepers, who as a great rule object to the manual extraction of the membranes, and who will infallibly put the blame on the operator if any ill results follow. I generally content myself with the exhibition of a purgative and an occasional cold permanganate injection.

I should think that the sodium salicylate, as recommended by "Country Practitioner," would be useful.

This is rather an important subject, and it would be interesting to hear the views of some other members of the profession, whose practice lies among calving cows.—Yours, etc.,

ANOTHER COUNTRY PRACTITIONER.

VETERINARY EXAMINATIONS.

To the Editor of THE VETERINARY JOURNAL.

DEAR SIR,—Your picture of "absurdity" was a little overdrawn in your editorial of the June number of the VETERINARY JOURNAL. For no one knows better than yourself that although the *practical* examination was held prior to the *theoretical*, still, they were both held by the same examiners on the same day, and each part of the examination regulated the other in the examiner's mind when he finally summed up the result in the evening. Therefore, at that time the examination was practically one test, although it was divided into two parts, one being held in the stable, the other in the examination room. Whether the student "passed the practical or not, he was allowed to present himself for the theoretical," just as a student was, and is now, permitted to present himself at all three tables of the second part (theoretical) whether he passed the first table or not. In fact, they were both part and parcel of the same examination in that day, just as it appears to me they are again now in the D examination.

Strange to say, the *teachers* were instrumental in separating the practical from the theoretical part of the examination, and in appointing four extra examiners to undertake the stable, clinical, or so-called practical part of the examination. However, *some of them* very soon regretted the step they had taken, for they found their students were in a worse place than ever, so far as getting the diploma of the R.C.V.S. was concerned, and why? Because the student had to satisfy *eight* examiners instead of *four* on the *same* subjects, which, I presume, anyone with a mathematical turn of mind might have foreseen would be the case, even if the student could "pass each part of the examination separately."

Moreover, if the student did not pass the theoretical part he was not allowed a chance at the practical at all; whereas, in the old days, the student was allowed up for *both on the same day and before the same examiners*, and if he did only moderately in the morning, he had a good chance of recouping himself in the evening, and then even passing with honours. But at the two separate examinations, with different examiners, the student had to thoroughly satisfy *both* or he would get "spun," or, in other words, he had to stand two distinct chances of being "stopped."

It is, however, very funny to see our council (of course the teachers had nothing to say in the matter) has practically gone back to the old method; and in spite of what—such an old hand as our Editor is—says, we think it is a step in the student's favour, *as we always contended our old system was*; and if you wish to make it more difficult (and expensive) again put on four extra examiners to undertake the stable work, and you will succeed, or in other words divide your D examination into two separate and distinct parts with different examiners.

Then, Sir, you go on to say, "Of course, in those days the examinations were secret ordeals and the results were known to the officials only." Now, no one knows better than yourself that this is only partly true, and that the truthful part of the statement was only adopted towards the latter end of the system, and why? Because some of the teachers and students were not sufficiently well-behaved (gentlemen) to be trusted with the result of the day's

examination until the examiners were clear off the premises for fear of being insulted, and we may remind you that this course was only adopted after such had actually taken place.

Then you style the examination ordeal "a farce." We think perhaps if this term were applied to the teaching (of our time, at least) it would be more appropriate. What either are now we must leave others to assume. All we can say is we don't think the average man is a much better practitioner.

Then you say "it paid the examiners," and we sincerely hope our examinations always will, as it is a responsible, onerous, unpleasant task, *and it ought to be paid for.* But, Sir, if you meant it in the same sense that one so-called professor had the audacity and impudence to suggest, viz., "that the examiners rejected students on purpose to get the fees for their re-examination," we think such contemptible significations should be styled what they are, viz., "disgraceful conduct," and should be dealt with according to bye-law 113.

Then you go on to quote what the medical examinations do; but we contend that we cannot, and ought not to take them as a pattern for our profession. The two will never, and can never, be carried out on the same lines. Although the medical profession may separate "medicine" from "surgery," that is no reason why we should. There is not the scope in our practice for *specialists* in the same sense that there is in the medical, and, we are afraid, never will be; so comparisons of this kind can very well be dispensed with, and let us manage our own profession upon lines suitable for it, independently of other bodies.

Then you ask "who are the members of council, who continually meddle with and muddle our Bye-laws?" In changing the final examination from one to two, and then back again to one, we should certainly say the teachers took a fair share, and whether they know anything about teaching and examinations we must leave your readers to guess from the changes that have been made, and their numbers on the council.

We compliment you, however, on the second part of your Editorial, as there are some sound arguments *re* the arrangements of some of the subjects and the times devoted to them, but more especially for your cordiality and praise of the examiners, which of late years has been so conspiciously wanting.

In conclusion, we may say we are surprised at you Sir, in raking up the unpleasant past, which we had hoped would never be spoken of again, especially by the VETERINARY JOURNAL which at the time took such a strong and staunch view of the honourableintentions of the gentlemen who at that time acted as both Councilmen and Examiners, and it always contended they did their work fairly, independently, and well for the good of the profession; and no one at the time, nor has any one since, brought a single incidence against any of them, and we are still of the opinion that a gentleman would honourably hold *both* offices, and he who is not, should hold neither.

More particularly are we surprised at you, Sir, who at the time was careful, anxious, and clever enough to keep out of the thick of the opprobrium.

Apologizing for having to intrude upon your space for the painful task of defending the insults cast upon gentlemen (some of whom are dead and gone) who were formerly the staunch supporters of the Veterinary Profession, and who were in a sense degraded by false representations and accusations which could not be, and never were, supported by facts.

Yours faithfully,

GEO. A. BANHAM.

[I publish the above letter, although written in so hostile a spirit to myself, because I wish to show myself faithful to the policy which I laid down for my own guidance in the first number of the VETERINARY JOURNAL which I edited.

It is right that the readers of the VETERINARY JOURNAL should know both sides of every case that comes up for discussion, and for my part I fear no foe. I leave Mr. Banham's letter to speak for itself; it is rather prolix and incoherent, not to say rambling and feeble; I presume it contains all that is to be said on the other side. One point I must contest with Mr. Banham, and that is his treating examiners from the mathematical point of view. It does not follow by any means that passing becomes more difficult in proportion as the number of the examiners increases, but rather the opposite; each examiner has his own pet theories and sometimes his own pet prejudices, I fear it must be confessed; to that extent he is a specialist, or, as ill-natured people might say, a faddist, and therefore dangerous to those students who do not think like him or know his little failings; consequently there is safety in numbers, because if a student has eight examiners instead of four he is more likely to fall in with a larger number of men who understand him. Apart from this, medicine and surgery, whether human or veterinarian, are so vast and complex that it is impossible to parcel them out amongst a small body of men. Every year new subdivisions take place, and the number of examiners must be increased accordingly. Mr. Banham is a *laudator temporis acti*, he sings the praises of the good old times; well, perhaps they were good, but, at any rate, they have gone and they can never return. Happy is the man who can adapt himself to the changes that time brings about. By-the-way, was Mr. Banham ever an examiner on the practical part of veterinary medicine? —ED.]

SHOEING-FORGES.

To the Editor of THE VETERINARY JOURNAL.

SIR,—Is it not time that our Council stated definitely what is conduct disgraceful in a professional respect, and what is not?

In my opinion, keeping a shoeing-forge does more to lower the profession in the eyes of the public than advertising does, but many of the Council keep shoeing-forges, and I conclude, fee grooms to take horses there to be shod, as stated in the enclosed cutting, which I hope you will publish. Members of the Council appear to be able to advertise, indirectly at least, as much as they like. Is not advertising oneself by regularly giving evidence for the R.S.P.C.A., in supposed cruelty cases, against other veterinary surgeons, conduct disgraceful in a professional respect? Perhaps Professor Pritchard (as he likes to be called), will tell us how many times he has given evidence *against* the R.S.P.C.A. It may have been necessary to do so once or twice just to remind the Society that they *must* engage him on their side.

One can't help being struck by the sorry lot of vets. the R,S.P.C.A. had to give evidence for them in the Halifax Docking Case. I should think these three *gentlemen* were very hard up for a job. In conclusion, the veterinary surgeons who do *not* keep shoeing-forges are in the majority, and if they would put their heads together, they could soon weed those out of the Council who do.—Yours etc.,

ANTI-HUMBUG.

GENTLEMEN'S SERVANTS AND TRADESMEN.

ALLEGED SYSTEMATIC BLACKMAIL.

"A Veterinary Surgeon," in the course of a letter to the *Field*, makes some striking allegations against gentlemen's servants. "The gentleman's servant," he says, has but a single lesson to receive in what he calls 'discount,' and ever afterwards bleeds all with whom he comes in contact, or else withdraws

his patronage. Please mark the fact that it is his, and not his master's patronage; the latter only writes the cheques, all else is in the hands of the coachman or stud-groom. Few readers of the *Field* will attribute any share of the late farriers' strike, for instance, to the coachmen; but I could easily prove to your entire satisfaction that a sum of 1s. on each set of shoes is the minimum which any West End coachman will accept, in addition to 10 per cent. on the account when paid. The more respectable farriers and veterinary surgeons decline to go further than this; but the majority of men who carry on shoeing forges are compelled to book shoes that are never supplied, and divide the plunder with the coachman. Many horses keep on their shoes too long, and thereby induce corns, while the owner is charged for a new set every three weeks, and removes once a fortnight. There are master farriers who will give one or two sovereigns for a coachman's promise to have his horses shod at the said farrier's forge next season. Some of the largest businesses have been built up on this system, and the account is 'arranged' between the coachman and the foreman, or master of the forge. The farriers work hard and earn really good wages, but, knowing how easily the horse-owners are robbed, they desire a greater share in the plunder, and see no reason why yet another shilling should not be imposed, and this time for the benefit of the men who actually do the work. While the veterinary profession has been struggling for a social status to the extent of forbidding the most innocent form of advertisement, many of its members keep shoeing forges in London, where the most flagrant dishonesty is practised. If that profession is really to be elevated, there must be a total divorce from the forge. Owners will not be troubled with details; they do not occasionally check the account, or notice the shoes. In vain do men like Captain Hayes write practical works for horse-owners, who will accept no bother. The average gentleman roughly estimates so much a year for the stables, and, if it is not largely exceeded, is content to shut his eyes to habitual robbery until some of his rogues fall out, and in unguarded moments speak the truth."—*Birmingham Gazette*, June 7th, 1897.

[We have inserted this letter from a well-known veterinary surgeon anent a topic which requires grave consideration by all members of the profession. It seems that great minds run in the same groove, and we, before receipt of this letter, had written our article about the position of veterinary surgeons in the Auxiliary Forces. Later on we, after hearing the arguments "for the permission to keep a forge" and "the arguments against keeping one" by veterinary surgeons, will give our own opinions.—ED., V. J.]

RELIANCE TOOTH RASP.—ARNOLD'S PATENT.

SIR,—With reference to a notice on the above which appeared in your issue for May, you say "Hitherto rasps with moveable plates have been made with screws either fitting into the plate, or pressing on it, and as these plates are necessarily hard they are always breaking."—Now with regard to the statement contained in the first part of the paragraph, I desire to point out that I exhibited at the Birmingham Meeting of the N.V.M.A. held in July, 1895, two kinds of rasp holders, fitted with my patent Duplex Reversible plates, which were not secured by screws either "going through or pressing on them" and that these rasps were on sale some time before they were exhibited at the meeting.

Both of these holders were of American origin, improved by me by the addition of a three-quarter head security screw used to lock the shank at the junction, and so prevent the rasp turning round in the mouth when side pressure is put on.

One holder consisted of a strong oblong frame cut through cross-wise at the shoulder, which causes it to slightly spring open, and by means of a screw at the cross-cut the two sides of the frame are compressed and the plate held securely.

The other holder, exhibited at the same meeting, is a light wire frame to which are fixed metal flanges, into which the plates are instantly fitted and the holder is easily and firmly secured by a sliding ferrule and bayonet catch.

In this frame both surfaces of the rasp plate are exposed, and thus it can be used for top or bottom molars without removal from the animal's mouth.

This, together with the angle at which the plate is held, makes it possible to overcome the curve of the upper jaw, and to reach the back molars with the upper side of the plate; this cannot be accomplished with any other rasp. Now as to the "Plates which are secured by screws continually breaking," as the inventor and patentee of the patent Duplex plates, I may perhaps be allowed to say that from a very large number sent out, with the exception of one which had a flaw running from the screwhole outwards, I have never seen or heard of a fractured plate.—Yours faithfully,

8, Fisher Street, Red Lion Square, W.C. C. H. HUISH.

[This, although we insert it, is we think a matter for Mr. Huish to discuss with Messrs. Arnold & Sons direct, and not through the press.—ED.]

Reviews.

THE rapidly-growing knowledge of the organisms producing disease has caused a corresponding increase in the substances designed to combat and prevent their growth. Among antiseptics and germicides of modern introduction and of proved value, Chinosol holds a very high, if not, indeed, the highest place for real efficiency, and bids fair to outrival the time-honoured carbolic which is the basis of so many of the advertised powders and fluids. There are two ways in which one may judge of the value of an antiseptic or germicide. The first and the most valuable is by actual every-day practical experience, the other by laboratory experiment. So far as laboratory experiment goes, Chinosol has been shown to have a most surprisingly high value by the experiments of Professor Emmerich, of Munich, Dr. Alfred Beddies, of Halberstadt, and Messrs. Chattaway and Pearmain, of the Apothecaries' Hall. In addition to the evidence yielded by experiments made by these gentlemen, we understand that an exhaustive research on the action of Chinosol on different bacteria is being made by Mr. C. G. Moor, which will be shortly published, and confirms the reports of the above-named bacteriologists. Unlike nearly all active germicides, Chinosol has no injurious action on the skin or tissues, and is non-poisonous. It is a most active deodorant and oxydising agent, and only requires a fair trial to ensure its world-wide adoption for every purpose where a deodorant or antiseptic is employed.

Communications, Books, Journals, etc., Received.

Second Report on the Departmental Committee appointed by the Board of Agriculture to inquire into the Etiology, Pathology, and Morbid Anatomy of the Diseases classed as Swine Fever; The Lancet; Land and Water; Veterinarian; Veterinary Record; American Veterinary Review; Journal of Comparative Medicine; Australian Farm and Home; Results of Use of Tuberculin, by James Wilson, M.A.; Bacteriological Diagnosis, by St. John Reid; Country Life Illustrated; Recueil de Médecine Vétérinaire (Alfort); La Presse Vétérinaire (Paris); L'Echo Vétérinaire (Liége); Annales de Médecine Vétérinaire (Brussels); Berliner Thierärztliche Wochenschrift (Berlin); La Clinica Veterinaria (Milan); Il Nuovo Ercolani (Pisa); La Revista Veterinaria (Buenos Aires); Deutsche Thierärztliche Wochenschrift (Hannover und Karlsruhe); Archivos de Medicina Lisbon: José Bastos); Revista de Inspeccion de Carnes Mataderos y Mercados (Vitoria).